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SELECTED MILITARY TRANSLATIONS

ON EASTERN EUROPE (9)

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SELECTED MILITARY TRANSLATIONS ON EASTERN EUROPE (9)

INTRODUCTION

This is a series publication containing translations of items of military interest from various publications of the Eastern European countries. This report contains translations on the subjects listed in the table of contents, arranged alphabetically by country.

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CZECHOSLOVAKIA

Preparations for Okres Red Cross Conferences

/Following is the translation of an unsigned article in Pracovnik Ceskoslovenskeho Cerveneho Križe, Vol VIII, No 2, Prague, 10 February 1961, pages 52-54./

According to the resolution of the Chairman of the Central Committee, one-day okres conferences of the CSCK (Czechoslovak Red Cross) will be held during the days of 12, 19, and 26 March 1961. The conferences will climax our after-convention campaign. The main theme of these okres conferences will be aimed at fulfillment of those tasks which were determined by the resolutions of the convention and may be briefly described by using the banner of the convention: "Headed by the Communist Party of Czechoslovakia, we are for the development of our socialist country, for the health of the people, for peace!"

In some krajs, in connection with the preparation for the okres conferences, questions concerning the length of the term for the new okres committee and the supervisory commission will be discussed.

The new procedural manual of the CSCK, which has been approved by the Third Convention, says explicitly that the okres conferences of the CSCK should meet, as a rule, only once in two years. It may be said that the present okres organs, which were elected last year after the territorial reorganization are functioning well, as evidenced by the fulfillment of all the goals. Another evidence is our active cooperation in securing the important national actions and economic goals. However, in each okres it will be necessary to appoint new members to the okres committees and to the supervisory commissions to replace those members who could not participate in the work of CSCK for various reasons.

During the last year, we gained rich experiences from the work of our okres committees working under various conditions. Nevertheless, it will lead toward improvement in the activities of our okres committees and our supervisory commissions, if we analyze our experiences, remove shortcomings and create conditions for the further development of initiative among the members, indications of which were apparent at the annual meetings of the plenum.

We have to develop further the organization of the CSCK in the okres, which by itself is a sufficient reason to organize okres conferences for this year. This means that the term of membership in okres committees and okres supervisory commissions will be one year, because we shall have another conference in each okres next year. The same rule applies for kraj conferences. Next year, however, the okres organs of the CSCK will have a two-year term.

Other principles of the new organizational manual will also be materialized this year. Further democratization, more power to the okres

committees, better coordination with local organs, and active cooperation of all the members within their respective regions, will be sought.

The kraj and okres committees started preparations for okres conferences during the annual meetings of their members. The kraj committees, for example, in Severocechy and Stredocechy have, in coordination with okres committees, worked out political and organizational plans to secure the okres conferences for this year. The members of the central committee of the kraj and other leading officials are personally responsible for the preparation of the conferences in each okres.

The kraj committee of Severocechy approved the report of the activity committee. In this kraj, the commitment movement to glorify the 40th anniversary of the establishment of the Communist Party of Czechoslovakia (KPC) is in full swing. The okres committees will report the results of the commitments to the representative of the Communist Party. In Stredocechy the committee issued detailed instructions concerning the preparation of okres conferences so that they would be in line with plans and goals set up for the first year of the Third Five-Year Plan. Also, steps were taken to make sure that the cost of those okres conferences are paid by using local funds. The same preparations were taken in other krajs.

In order to ensure that all conferences will be organized in a similar manner, the following instructions should be followed:

Program of okres conferences:

a. Opening
b. Election of the executive committee; approval of program; election of trust, election, and proposal commissions.
c. Report on last year's activity, and setting up new plans for the okres organization.
d. Report of the okres auditing commission.
e. Debate and closing comments.
f. Election of the new okres committee and auditing commission.
g. Resolution and closing of conference.

There should not be more than 250-300 persons attending, including guests. Should there be a greater number attending, the approval of the kraj committee of the CSCK will be needed. Each local group should be represented by at least one delegate. Detailed instructions will be published in Pracovnik No 22, 1960. As far as the attendance of guests is concerned, the same principles will be followed as last year (Pracovnik No 6, 1960).

The cost of conference should be covered by local financing, if necessary by invoking help of local union groups.

The election of the new okres committee and okres auditing commission: Following the resolution of the central committee, the okres organs of the CSCK will have the same number of members as last year. The okres conferences will elect 27 members of the okres committee, five alternate members, seven members and three alternate members of the auditing commission.

In the first meeting of the committee, the chairman, vice-chairman, secretary, and six other members of the inner committee will be elected. A similar election will take place at the first meeting of the okres auditing commission.

While selecting officials for the new okres committee, great care should be exercised to select proper officials for the okres commissions; the chairman of the commission has to be a member of the committee, according to the new manuals of the CSCK. The okres committee will have the following commissions: organization, health, juvenile, public relations, agriculture, anti-alcoholic, and, in most okres, a transportation commission. There should be 5-10 members in each commission. The commissions should become fully active right after the conference, and the new okres committee will then elect not only the chairmen of the commissions, but also their members.

The commitment movement: This movement will take place during the okres conferences and the 40th anniversary of the founding of the KPC will be used as commitment incentive. This way, the goals and resolutions of the third conference of CSCK will be best fulfilled. Special attention should be given to agriculture. The future tasks of okres organizations will be based upon resolutions of the third conference of the CSCK. The reports and their evaluation will take into consideration the new territorial organization. All the critical evaluations will be based on last year's resolutions of the okres conference and other meetings for comparison. The basis for the next year's resolutions will be the directives of the Central Committee of the CSCK, which will meet on 25 February 1961.

The reports should evaluate the new forms of activities, cooperation between commissions and committees of the CSCK and national committees, and cooperation with other groups and members of National Front, mainly those with which the CSCK has an agreement concerning cooperation.

We believe that okres conferences are the source of experience for our officials and secretaries. It is of great importance that the level of our conferences be higher this year than in previous years. The dealings of our okres conferences should be closely related to the dealings of our third national conference.

We want our officials to keep in mind that the conferences will take place at the same time as the Third Five Year Plan initiation, and the festivities commemorating the 40th anniversary of the KPC. This anniversary will be celebrated during the month of May. The preparations for the okres conferences should manifest our affinity to the Communist Party of Czechoslovakia on all levels of the organization of CSCK.

10,088
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POLAND

Computing Machines Developed at the Polish Military Technical Academy

[Following is the translation of an article by Porucznik Magister Engr Teodor Zubowicz in Zolnierz Wolnosci (Soldier of Freedom), Vol XI (XVIII), No 284 (3136), Warsaw, 2 December 1960, page 4.]

Stairs lead down to a deep steel and concrete shelter. A long table in the center. On it is a number of maps. At one of them is the commander and a group of officers. An officer enters the room. He reports and hands the commander a small piece of paper. Having read it, the commander turns to the officers: "At twenty hundred hours send two tank batallions to the Hill 235 region. A group of air force bombers should strike at point "N" at twenty hundred fifteen hours."

An ordinary incident known to many, but . . . . What was the piece of paper brought in by the officer to the army commander? Whose recommendation helped in the decision?

Let us look into the room from which the officer emerged. There we expect to find staff officers; they may be able to inform us. But what is this? There is only one officer in the room. The appearance of the room suggests a communications laboratory. Electronic devices the size of book-cases line the walls. The above-mentioned lonely operator is sitting at an operating console.

This room houses a sort of "brain" of command headquarters. Its basic element is a fast-acting electronic digital machine. It is this machine which analyzes in detail information continually flowing in from the battle field. The results of this analysis are transferred by the machine on to a special card, the reading of which permits an evaluation of the battle situation and formulation of an appropriate decision. Thus, a machine acts as "adviser," as the commander's aide? Yes. And although the scene is a vision of the future, let us add certainly not of the distant future; already today work on the construction of electronic machines and their military application is being carried out in many countries. Work connected with the construction of different types of electronic machines is carried out also in our country; among others in the J. Dabrowski Military Technical Academy, with a team lead by Major Engineer Maciej Stolarski.

In the Cabin e-Lined Room.

According to Engineer Stolarski, the theoretical problems of calculation and construction in the new military technology demand mathematically complex solutions which involve much time and whole

staffs of people. There are also problems which would be difficult to solve even with many available hours. Technical progress today is so rapid that the solution of new problems cannot be attempted with the old methods, all the more because the equipment of modern armies is comprised more and more of automatic and semi-automatic devices. Contemporary combat conditions also require the commander to have continual knowledge of the current combat situation. Without the help of automats, more specifically, electronic machines, he will not be able to have this. Hence the need to conduct work on the construction and specific application of electronic machinery.

One of the machines constructed at WAT (Wojskowa Akademia Techniczna -- Military Technical Academy) is located in a mdeium-sized room. The apparatus, gleaming with a coat of fresh paint, is lining the walls. It is clean and pleasant here. The floor, covered with a rubber mat, absorbs the sound of steps. Only the monotonous hum of the power supplies is heard. Outwardly, the simple electronic devices have the appearance of fair-sized lockers. Only from the back does one see tens of miniature "bells" of the machine connected with miles of cables carrying messages comprehensible only to the machine. Only an expert can find his way in this maze.

The control console -- here the "goods" are received by the machine. Again tens of openings, labels, pilot lights. Depending on the task being executed, the machine receives a program in accordance with special schemes.

This is an analog machine which can be used to solve very complicated differential equations up to and including sixteenth order. It may also be used as a model of different kinds of configurations. Machines of this type can simulate the behavior of such models. The phenomenon under investigation is recreated in the machine by certain electrical processes, e.g., electric potentials or currents. In other words, the physical configuration studied is replaced by an electrical configuration governed by the same mathematical equations. Thus, the electrical configuration created is analogous to the physical configuration studied (hence the machine's name). All this is somewhat complicated and obscure, but to make the above clear it is enough to quote an example.

Rocket Firing In the Machine

The rocket is one of the most complicated and most expensive products of modern technology. The cost of one test flight of a ballistic missile, according to the Western press, is over a million dollars. And is one test enough? Usually no. The tests must be carried out tens of times. Is there a way out? There is.

Precise use is made of analog computers which can simulate rocket flight. It is enough to interconnect the elements of the machine in such a way that the voltage should change in the fashion

of the laws governing motion of the rocket; on the osciolloscope screen, for example, we obtain an accurate picture of a rocket flight as a graph of its path. Now we have only to suitably connect the guidance mechanism with the rocket, and we shall know how the rocket will fly and what will have to be changed to transform this motion into the desired one. This is, of course, highly simplified. In reality, things are more complicated, but all we were after was an example.

An important advantage of analog computers is that the resulting graph is obtained in real time, which is rather significant.

All the construction elements of the above-mentioned analog computer were worked out at the WAT. Engineer Joseph Kapica designed and constructed it.

"BINUZ," The Youngest in the Family

Digital computers are another type of electronic machines. In Poland several machines of this type have been constructed; among them, in the Zaklad Aparatow Matematycznych PAN (Mathematical Apparatus Institute, Polish Academy of Sciences) is the XYZ computer which we have described in the past. However, the newest construction in Poland in the digital computer family is "Binuz." It originated in WAT, its designer and constructor was Major Engineer Maciej Stolarski. This machine, as well as the one discussed above, is destined mainly for educational and didactic purposes. Why is it called "Binuz?" Because it employs the so-called binary complement system; the abbreviation for these words leads to the name.

Digital computers may be used to solve a wide variety of problems. They are universal and can perform computations for an arbitrarily selected program. They may also have a wide variety of military applications: in analysis of combat action, in anti-aircraft systems, in quartermaster services, etc. [See Note[.

([Note:[In the near future we shall write further about the military applications of electronic computers.)

How does an electronic digital machine work? Let us explain it very briefly. It resembles the work done by a computation office which accepts given problems for solution, applies given procedures, and obtains the required result. In the course of the work of such an office, various kinds of instruments forms, tables, etc. are used; all the operations are performed in a certain sequence. A similar process occurs in an electronic digital machine.

A so-called program, which is a collection of all instructions and numbers necessary for the solution of the given problem, is set up. Every instruction indicates what arithmetical operations (addition, subtraction, multiplication, division) the machine should perform and on what numbers, and where the result should be stored.

All numbers and initial data as well as instructions are fed into the machine via the input mechanism. This includes various mechanisms which enable data to be appropriately prepared for the machine (coded), with hand or automatic feeding, etc. It is a sort of filing of a comprehensible order with the computational office.

If the order is to be correctly executed, the computation office must contain an element co-ordinating all operations of the office, and directing its activities. In the machine the control mechanism fulfills that role.

The arithmetic unit in the machine is the equivalent of the calculating section of the office which directly employs those who execute all the calculations.

During the course of the calculations the office makes use of various types of tables, values of certain functions (also in the form of tables), flow diagrams, solutions of various problems, etc. The office must also collect and store the instructions it received. All these functions are performed in the office by its archives and library, and in the machine by the so-called memory. The latter stores the program of the problem being solved, the necessary data and numbers, the results of partial computations, and final results, which are presented to the outside by the output unit (the equivalent of which in the office is the section dealing with final results). This is a very broad outline of a digital computer. [See Note].

([Note:] We refer those readers who are more interested in the construction and workings of electronic computers to the very readable booklet by A. B. Empacher entitled "Maszyny licza same? ("Do machines compute by themselves?"), published by Popular Science (Wiedza Powszechna) as part of the series "Atomium."

The "Binuz" at WAT can conduct computations with an accuracy of ten decimal digits; it does this with a speed of over one hundred operations per second. It possesses a magnetic drum memory with a capacity of 512 words and a teletype for an input-output unit.

Let me take this opportunity to mention another device constructed by WAT a communication machine used for training purposes. This compact device constructed by Engineer S. Jarosinski permits a pictorial representation of the workings of an electronic digital computer. The sequence of events taking place in the computer may be viewed in the special construction.

Until now I have not once used the words "success" or "achievement" to describe the value of the work done by the WAT team which is concerned with electronic computers. I have avoided these words purposely, because I wanted to introduce the readers to the complex problems of this, one of the newest branches of modern science and technology.

Let the reader judge whether I have succeeded.

One thing is certain. The work of the young and ambitious scientific team from WAT is an important achievement, and places itself in the rank of the leading teams in Poland concerned with the construction of electronic computers. It also attests to the constant interest in the development of the newest trends in technology shown by WAT and to the rising level of our young scientists. This is most praiseworthy.

10,024

CSO: 1548-S/a

Training Problems at the Officer Antiaircraft Artillery School

[Following is the translation of an article by Major Dyplomowany R. Labinski in Zolnierz Wolnosci (Soldier of Freedom), Vol XI (XVIII), No 284 (3136), Warsaw, 19 January 1961, page 2.]

Technical progress is making increasing demands on antiaircraft artillery officers in regards to general as well as military education. It is above all the expertise of line officers which is decisive in incorporating the latest advances of knowledge and technology into practical training of troops. From this results the need to equip the line officers with a definite store of knowledge. However, this store is very extensive and constantly increasing. It appears, then, that it would be necessary to sub-divide this teaching process in the antiaircraft artillery schools into two phases.

The first of these would provide full technical and tactical preparation for the transmitting of new technological achievements to the troops in the most practical sense. The second phase, on the other hand, would bring out technical knowledge and prepare officers for staff and command functions.

The first phase of training would be encompassed within the framework of officers' school or the advanced school of antiaircraft defense; the second within the framework of ASG [?]. Together they would assure the officers of ahigher military education with an aspect of leadership.

The rapid accumulation of educational material has caused didactic verbalism to become dominant at times. In my opinion, this is the result of a reluctance to introduce the new and of a conservative holding-on to old forms in training methods and programs. I believe that as a result of this, training methods are not keeping pace with technical and scientific progress.

Would it be a question of finding some new educational system? It would not seem so. The essence of the matter is to rely on principles generally accepted in advanced professional education while abandoning the present methods of OSAPLot (Osrodek Szkolenia Artylerii Przeciwlotniczej -- Center of Training of Antiaircraft Artillery [?])

Furthermore, it appears that perfection of training methods should be directed toward narrower specialization. This alone will permit the transformation of theoretical knowledge into expertise and working habits. The narrowing of specialization does not mean either turning to formal education, which gives basis for independent thinking

and gathering of information, or to purely materialistic education solely satisfying practical needs. It is essentially a question of such a choice of material as to permit the simultaneous development of the intellectual capabilities of officer cadets and officers, and of practical applications.

Concerning teaching methods, I think that use could be made of the experience of such institutions as teachers' seminaries and engineering night schools, which are of a similar character as our officer schools. The method of memorizing material should be abandoned in professional military education. This is necessary if our aim is the broad intellectual development of officer candidates; this development is the basis for gaining further knowledge, expertise, and a foundation for independent work.

The formulation of an appropriate teaching program, which cannot be a collection of loosely tied, hastily gathered material, is one of the basic factors affecting the results of education. The person responsible for the program should be fully informed about the general tendencies in military training (resulting from technical progress); he also should take into account the growth potential of the given military speciality, which is especially important in antiaircraft artillery.

The program of an officers' school should constitute a unified whole. It should be related to programs of officer-improvement courses and the ASG. Otherwise, overlapping will result, increasing the total time of educating an officer, etc. A bad program unnecessarily taxes the memory of participants and limits the possibilities of broadening their knowledge.

The contents of basic learning materials are very important to education. The responsibility for the contents should rest with the officers of the didactic=scientific cadre. They cannot always assume this responsibility. Libraries are not always well-equipped and administered; this means that the instructors are unable to keep the contents of the educational material up to date.

The results of education also depend on the methods of lecturing, for contents alone do not determine the quality of a lecture. A dogmatic presentation lacking substantiation and not allowing the candidate to express his own judgments and to draw conclusions may yield fair results, but only in the form of grades. However, the real purpose of education would be lost; our officers would have a superficial knowledge, little self-reliance, and would easily give up their own opinion. The lectures, then, should foster an active and conscious acquisition of knowledge.

The results of education no doubt depend to a large extent on the instructor. The instructor directs the process of assimilation of knowledge. His authority, acquired as a result of the correct ideological attitude, excellent preparation for his work, and a proper, active, and honest attitude to the service, determines his achievements. It is important, then that the educational cadre be given

particular care and scope for development.

Educational programs and planning should not, in my opinion, be left to the competence of the schools. They should be the responsibility of higher authorities, with the schools collaborating. As I mentioned above, a chief planner should be assigned to work out this kind of program and he should be in a position to oversee the whole of the educational problem. The main difficulty of framing such programs rests in the choice of subjects.

I believe that the starting point should be the tasks set before the antiaircraft artillery officers. In order to fulfill these tasks well, it is necessary to assimilate a great amount of knowledge, this involves much time. It is, therefore, necessary, to lect the essential, so that the officer will carry out the duties of a given specialty of antiaircraft artillery. In the selection of subjects, care should be taken that topics do not overlap, but supplement ene another.

Since we are considering the necessity of further changes in educational content, teaching methods cannot remain unchanged. At OSAPLot lectures, informal talks, demonstrations, exercises, and some elements of laboratory work are used; the cadets also study from books and scripts, and revision of material is also practiced. In spite of this, results are not fully satisfactory. Of course, I am not referring to grades or to a revolutionary elimination of any teaching methods.

It is a matter of taking advantage of those past methods which combined time-saving with complete mastery of an increased store of knowledge.

Of course, such methods as lectures cannot be eliminated. Nevertheless, a more up-to-date method would be one dominated by technical aids and demonstrations, experiments, and exercises. By demonstration, I mean a demonstration of combat equipment and its elements, making use of diagrams, photographs, graphs, plans, and slides.

Special consideration should be given to film showings. The film should play a very important part in new teaching methods. Its great potentialities are illustrated by the showing of educational supplements. It can be used to teach science and humanities subjects. The use of films can improve and accelerate the teaching process. Naturally, training films demand a very thorough and careful preparation.

The use of tape recorders and phonograph records can also have great influence in teaching.

Laboratory work should also be considered as a useful teaching method.

The functioning of contemporary antiaircraft equipment based on chemical processes, electronic, and mechanical devices, demands a comprehensive laboratory knowledge and the practical combination of different branches of science.

The above-mentioned educational methods are connected with aspects of knowledge assimilation. The officer, however, must apply them in practice; from this results the necessity of acquiring practical knowledge and working habits. Exercises serve this aim.

Hence, from all known educational methods, we should be taking particular advantage of the lecture, demonstration, the exercise, and laboratory work as the principal methods.

Finally, with the development of knowledge and the resulting technical facilities, we should exploit to a greater degree those teaching methods which permit the assimilation of greater amounts of material in a shorter length of time.

Obviously, education demands adequately organized and equipped libraries, laboratory work demands laboratories, film showings demand film and projection rooms, and worthwhile exercises require adequate material backing. In conclusion, we are dealing with a gradual but consistent rebuilding of the organizational and didactic structure of the school and with the expansion of its material base.

10,024

CSO: 1548-S/b

Speeches on Education and Training at the Party Plenum of the Warsaw Military District

[Following is the translation of an article by Pulkownik Magister Czeslaw Bielecki in Zolnierz Wolnosci (Soldier of Freedom), Vol XII(XIX), No 6 (3166), Warsaw, 7-8 January 1961, page 2.]

The enlarged Plenary session of the District Party Committee of the Warsaw Military District took place on 30 December last year with the participation of commanders of tactical units and units of equal rank, their aides for political matters, secretaries of Party committees, and other activists of the PZPR (Polska Zjednocznona Partia Robotnicza -- Polish United Workers' Party).

Officers holding executive positions in the headquarters of the military districts also participated in the conference. The discussion at the plenum was devoted to broadly conceived problems of the functioning of the command and party-political apparatus in the process of training and educating the troops.

The conference ended with the passing of a resolution.

We have already informed the readers about this plenum. Today, however, we will include the abbreviated text of the opening speech by Comrade Wyderkowski and excerpts of statements made by some of the participants.

Comrade John Wyderkowski: Certain Remarks Concerning the Work of the Command and Party-Political Apparatus

Comrade Wyderkowski pointed out at the beginning that the activities of the command and party-political apparatus are closely connected. Both are responsible for the training as well as the education of soldiers.

The cadre faces ever more difficult and more complicated tasks because of the great increase in fire power, the considerable mobility of forces resulting from the motorization and mechanization of the army, the greater scope of future operations (in depth as well as in width), and their continuity.

The main object of our training and educating processes is the young man whom society entrusts to us with complete confidence, and for whom it demands adequate preparation to defend the borders of the people's Motherland. To train and to educate well means to react on soldiers in such a way as to make them systematically acquite and perfect abilities and habits essential to carry out vic-

torious military activites. It also means to develop their political consciousness, their feeling of responsibility for the fate of the Motherland.

During the past year of training, units of our Military District achieved further successes in improving their combat readiness and their ideological unity through educational work, in training, and in discipline. A further strengthening of ties with local branches of the People's Government, and with Party and social organizations took place. The political activity of the cadre and the soldiers increased.

Next, Comrade Wyderkowski discussed the deficiencies which still exist here and there in the process of training and educating soldiers. He drew particular attention to the necessity of strict adherence to military regulations and of applying appropriate educational methods from the point of view of theory and practice; this is to mold a soldier's personal set of values, such as honesty, truthfulness, courage, initiative, and so on.

A soldier will fight well if he acquires the above qualities. For this purpose he must undergo appropriate training; in the course of this, a given educational system reacts on him. A soldier's character undergoes changes during military service. These changes will be noticed and directed only by a leader, an officer who will get well acquainted with his subordinates and who will be able to draw the right conclusions from this acquaintance.

Matters of Training and Education in the Center of Attention

Experience shows that not all leaders pay due attention to the above-mentioned matters; there are even now some leaders of subunits -- admittedly few -- who treat the problems of training and education in a formal manner. That is to say, they see that everything is done according to plan, but are insufficiently interested in the qualitative standard of the courses undertaken.

For example, this is the way some commanders treat drill, regulations instruction, and weapons instruction. It is also worth mentioning that in certain cases no appropriate conclusions are drawn from training and education experience and that the same mistakes are committed year after year.

A basic condition for obtaining good results in training and education is to carry out the activities on the program regardless of atmospheric conditions and the time of day or year. Our units understand all this quite well. There are, nevertheless, some shameful exceptions. For example, the leader of a certain subunit permitted the first class in observation to take place in a lecture hall, although it is well-known that activities of this type may take place only and exclusively in the field.

Certain officers do not engage squad leaders sufficiently to participate directly in the training of soldiers; this does not at all promote the development of the abilities of commanding non- commissioned officers.

It is also difficult not to mention that exercises, particularly tactical exercises, however well they may be prepared, will not have the required effect if the actions of the person doing the exercises do not also take into account the actions of the opponent. But, unfortunately, it may sometimes be observed (particularly in the lower levels of leadership) that battle-field simulation is artificially adapted to the subject and the terrain; this cannot, of course, give an appropriate representation of the opponent. It would seem that the reconnaissance element in particular should be engaged to assist in battle-field simulation.

Every leader organizing tactical exercises should understand the subject thoroughly, divide it into separate aspects, time the exercises appropriately, prepare a training base, divide the duties among instructors, and select an appropriate place or terrain to carry them out, keeping in mind that only well organized activities guarantee achieving the desired aim.

Good Discipline Assists in the Development of Initiative

Modern precision technology and complex, expensive combat equipment require not only proper technical abilities of soldiers but also a high degree of discipline. Military discipline, has a direct impact on all the penomena and spheres of our life. Its high level proves, among other things, that one soldier trusts another and the subordinate trusts his leader; it cements a team, makes it tightly knit, and vigorous. Of course, disciplinary practice has a great influence on the development of discipline. Superiors should always be particular, but at the same time, objective and fair. They should try to achieve a gradation in punishment as well as in distinction.

Initiative is one of the soldier's necessary qualities. It is true that a superior's order cannot be questioned, but the subordinate should execute it creztively, for no order can foresee all the conditions, sometimes very complex ones, in which the soldier may find himself; the soldier should, therefore, follow the superior's intention while displaying the maximum initiative.

Attention should also be given to see that the soldier carries his activities through to the end, as required by regulations.

Strengthening the Soldier Collective

We have good, selfless soldiers in the army. They know that they are being trained to acquire the abilities necessary to defend the borders of the people's Motherland.

The activities of the party-political apparatus play an important role in strengthening the unity of our ranks and in enhancing the soldier's consciousness.

The intensive work involved in, for instance, the Fourth, Fifth, and Sixth Plenums of the KC PZPR (Komitet Centralny Polskiej Zjednoczonej Partii Robotniczej -- Central Committee of the Polish United Workers' Party), the Grunwald celebrations, the anniversary of the formation of the PKWN [?], the constant struggle for peace carried on by socialist countries in the United Nations Assembly, and the results of the Moscow Conference of Communist and Workers' Parties, has clearly contributed to the improvement of the moral-political outlook of our troops.

Nevertheless, I would like to emphasize that in my opinion the political apparatus should, among other things, first of all mobilize the soldiers' collectives to a greater degree than has been done, create an atmosphere of condemnation for any violation of discipline and military order, in other words, condemnation of behavior which is not fit for a soldier and leader of the people's army; secondly, it should devote more attention to work, with the purpose of a still stronger cementing of such soldiers' collectives as the squad, the platoon, and the company. I am most concerned with the development of comradeship among soldiers. Anyone who has taken part in the battle against German fascism appreciates what it means for a person to know that he can count on his comrades' effective help in every difficult situation.

A few words regarding OSH (Oficerski Sad Honorowy -- Officer Honor Courts) and KSZ (Kolezenski Sad Solnierski -- Comrade Courts): both do not yet sufficiently influence the development of the moral character of the cadre and privates. Unfortunately, cases which are quite obvious only rarely come up before these courts. I believe, and I am not alone in this belief, that we should simplify the procedure of action of these courts, because the present regulations are rather too complicated and sometimes frighten of leaders from directing cases to these authorities.

The scope of work of the command and party-political apparatus is great and the tasks, complicated. To fulfill them we must, among other things, look for ever better methods of reacting on the soldiers. So, we must take better care of the cadre and privates, assist them in solving various difficult personal and service-connected problems. We must react on the soldiers in such a way that they will become conscious fighters in the struggle for socialism and for the future of our Motherland.

Certain Tasks of Party Organizations

The success of our work first of all depends on Party members. For this reason, everything leading to enhancing the leading role of PZPR members in units and subunits should be taken into con-

sideration in the activities of the party-political apparatus.

Work with the officer and non-commissioned officer cadre is undeniably of the greatest importance. The cadre has a decisive influence on the execution of the tasks facing the army. The Party organization mainly defines the role and right place of every party member in his unit., at the same time demanding exemplary execution of service-connected duties and good behavior in private life.

Evaluation of Party members' progress in carrying out the program of training and education should be carried out systematically at Party meetings and Party-service conferences. Should it be realized that despite the directives of the Statute the PZPR member did not fulfill his tasks, although he had every opportunity to do this, the Party organization should analyze matters in detail and, if it considers it justified, draw conclusions for the Party.

Report-election meetings have supplied us with a great deal of valuable material,and Party members have made very interesting proposals. The whole PZPR directive body should deal with putting into practice resolutions passed at these meetings and realizing the Party members' proposals.

An important part of our activity are the Military Youth Circles, Military Families' Organizations, and member organizations. The proper direction of these organizations and the Party members' active participation in their work are additional factors which have great influence on the realization of our duties.

Relations in our military collectives should be based on a healthy Party atmosphere. There can be no tolerance or indulgence for those who violate military discipline and order. At the same time every comrade, both the one who is a career soldier and the one who has been called for two years' service, should know that he will always find care and assistance in the Party organization.

Comrade Joseph Kuropieska: Matters of Cadre Preparation

In the introduction, Comrade Kuropieska stated that, on the whole, we already have quite considerable experience in training and educational work. We know what we should be doing. The point, then, is to put our experience into practice for every-day use.

We do not want war, of course, but until the idea of worl disarmament is realized (an idea for which the Soviet Union, Poland and all the remaining socialist countries are fighting so consistently) and while imperialist armies exist (among them, the ever more prosperous Bundeswehr), we, soldiers of the people's Polish Army, must do everything possible for it to be well prepared to defend our borders.

We should always remember, among other things, that combat conditions in the future atomic war will differ radically from combat conditions of past wars. It is for fighting under just such

conditions that we should consistently prepare all soldiers, particularly the officer cadre. The cadre should endeavor to acquire at least approximate knowledge of atomic combat conditions. I judge this to be one of the most important tasks in our training work.

Comrade Boleslaw Staniszewski: Simplify the Procedures of OSH and KSZ

It seems to me that the improvement of the functioning of the OSH and the KSZ depends to a great extent on the simplification of the courts' complicated procedures and a confirmation of sentences. The state of affairs are such that at present many leaders avoid bringing various matters to the attention of the above-mentioned courts.

I believe that the appropriate authorities should take into account the opinion of the lower ranks of the army.

Romrade Marian Jankowiak: Problems of Leadership and Competition

In the past, directives of WOW (Warszawski Okreg Wojskowy - Warsaw Military District) headquarters, in the field of developing the movement of leadership and competition, were striving among other things for:

1) further activation in this field of unit staffs, party committees and KMW (Kola Mlodziezy Wojskowej -- Military Youth Circles),

2) constant improvement of work methods used by leaders of platoons and squads in the field of reacting on soldiers,

3) propagation of positive experiences and for a wide popularization of leaders' and officers' work methods in the field of leadership and competition,

4) enhancing theoretical-method teaching with subjects, aiming to analyze leadership matters,

5) enhancing forms of work with outstanding soldiers who are not yet leaders and opposing expectations of the spontaneous growth of leaders,

6) a greater interest on the part of chiefs of individual services in work with subordinate soldiers.

It must be emphasized, that a decisive majority of WOW units accepted the mentioned directives conscientiously, adjusting them, of

course, to their own possibilities, and already obtaining visible results.

An unquestionalbe achievement of theleaders of the political apparatus, party organizations, and the KMW is the realization of a great improvement in developing an atmosphere among soldiers of the basic services; this promotes honorable rivalry among them. We can state that the successes in party-political work in the area of the development of leadership and competition are very real. The fact that leaders are very careful and cautious in awarding the "Exemplary Soldier' medal should also be noted.

The greatest achievement is the fact that the leadership movement has become an integral part of the life and training of troops. It should also be noted that there are already many soldiers with "Exemplary Soldier" or "Exemplary Leader" medals among us. Furthermore, in 1960 we had quite a few leading batallions, companies (squadrons, batteries), platoons, and squads (artillery equivalents.) In comparision to 1959, the number of leaders increased 100 percent in certain units.

In order to present a more complete picture of the situation in this area, I would also like to mention certain imperfedtions and deficiencies in our work. The following are among the most typical:

1) the continuing phenomenon of expecting only the spontaneous emergence of leaders, held by certain officers,

2) the unsatisfactory level of work of certain leaders with soldier-leaders. This work often enough ends with the awarding of the "Exemplary Soldier" medal,

3) the unsatisfactory state of work with leading soldiers in many subunits, amining at the preparation of these soldiers for the ranks of the KMW and, in the case of KMW members, for the ranks of the PZPR,

4) the insufficiently developed activity in some units, aiming at the propagation of positive experiences and popularization of the leaders themselves and their methods of self-improvement.

Comrade Zbigniew Miekus: Achievements Must be Earned

Every soldier needs the officer' s attention. This applies also to non-commissioned officers, about which I will now speak. If a commander wishes to obtain good results in training and educating his subordinates, he should, especially immediately following the arrival of young non-commissioned officers and incorporating them into the "educational machine," devote a lot of effort to

them. If he does this, his task will be relatively easier later.

It is necessary then, to inspect the activities of non-commissioned officers daily and to evaluate them objectively. These young leaders should not be left without care. I, for instance, give them detailed instructions at the very beginning about the way I want them to carry out directives in the various regulations and orders. I want them all to interpret them in the same way. I attach great importance to non-commissioned officers carrying out duties according to regulations.

I want to stress that after graduating from non-commissioned officers' schools, young squad leaders are generally theoretically well-prepared to fulfill their duties. All they need is practice, which they should acquire in line sub-units under the officers' supervision.

After the first days and weeks of independent squad leadership, certain non-commissioned officers come in a sense, to a breaking point, because in practice not all of them are able to cope with people. All of them want to carry out their duties well. Then, some of them start using educational methods which are not allowed.

But, then, what are officers for -- platoon and company commanders? They should not allow an inexperienced non-commissioned officer to go astray. If all subunit commanders fulfill their service duties appropriately, then their subordinates will never use forbidden educational methods.

I would like to add -- and I already have quite considerable experience -- that there are officers, particularly subunit leaders, who would want achievements to happen by themselves. But this has never happened, nor will it happen. Achievements must be earned!

In my work I take a great deal of advantage of the military, district, and central press. I teach my non-commissioned officers the same thing. I will give an example. One time an article appeared in Soldier of Freedom in which the author informed the readers how the cleaning of weapons was organized in one of the subunits of our forces. At that time I came to the conclusion that these people did it better than we did. I applied their experience in my unit. I also organized demonstration of weapon cleaning, using the new method, for non-commissioned officers. We really gained a lot from this.

Comrade Major Kazimierz Kulka: The Order of the Day Should be Strictly Adhered to.

Comrade Kulka drew attention to the necessity of adhering more rigorously than has been done to the order of the day in all subunits. Disregard of it leads in the end to a corruption of military disciplinary principles, because many a soldier can then think that military regulations are not as strict as they should be.

This may lead to the following conclusion: if others can change military routine specified by regulations, then nothing much will happen if I ever do the same thing.

As is evident from the above mentioned matters, leaders of all echelons should teach their subordinates to practice adherence to military regulations.

Comrade Arthur Jastrzebski: More Concern for Subordinates.

Comrade Jastrzebski emphasized that the discussion during the conference was fruitful, although, in his opinion, it was rather formal. It was also somewhat disturbing that a number of comrades, while discussing various matters of training and educating the troops, attempted to "compartmentalize" too rigidly the personal responsibility for these matters. It used to be said that this is the responsibility of the leaders and that of the political apparatus or party organizations. And yet, the speaker pointed out, it is a well-known fact that the training and education of soldiers concerns us all. Only the methods of work can vary.

In his remarks, Comrade Jastrzebski emphasized that in some units insufficient attention is still being given to the use of illegal educational methods by non-commissioned officers, and to cases of coarse treatment of subordinates.

This happens because, among other things, some superiors have become "detached" from various problems of their subordinates, and do not react sufficiently to their grievances. As a result of this, some soldiers take their grievances to higher authorities, going over the head of their immediate superiors. This does not reflect favorably on the political apparatus of these units and on party organizations.

Speaking of the party-political work in the forces, Comrade Jastrzebski quoted the words of the Minister of National Defense, Comrade M. Spychalski, who said at the meeting of the POP [?] Training Inspectorate of the MON (Ministerstwo Obrony Narodowej - Ministry of National Defense), "our work should be marked by zeal and aggressiveness!"

In considering atomic warfare, the speaker emphasized that in a future war -- should it ever be forced upon us in spite of everything -- the victor will be the one who will have modern techniques and an excellently trained army at his disposal, and who will also be firmly convinced that he is fighting for the just cause of the working peoples. Therefore, the soldier of socialist forces will be the victor.

From the Resolution of the OKP (Okregowy Komitet Partyjny -- District Party Committee) Plenum

The enlarged Plenary Session of the District Committee which took place on 30 December 1960 . . . states that from the problems included in the resolution of the last district conference, presently in force, in the present stage of the implementation of this resolution the following problems emerge:

I. In the field of education:

1) to form an atmosphere of frankness and soldierly comradeship in subunits . . .

2 2) to treat educational matters as the central problem in Party work.

To this end, attention should be focused on:

a) enrichment of the idealistic content of political and Party educational work;

b) increased activization of the Party branch organizations, Military Youth Circles, and the unorganized active segment of subunits;

c) improved efficiency of OSH and the KSZ. Requiring all POP [?] units to re-evaluate the activity of Party members in the courts and taking necessary steps to reactivate those institutions before the deadline of 31 March 1961. At the same time recommend to the District Committee Secretariat to gather opinions of the units regarding the statutes of OSH and KSZ and to reanalyze them, and approach the competent authorities with the view of eventual changes regarding the courts' procedures and their competence.

3) leadership and competition have, as we know, an important influence on the soldiers' moral-political state, discipline, and training. Practice shows that in this field it is necessary to activate staffs, the KMW, to perfect commanders' work methods, and to propagate and popularize the best forms of activity.

II. In the field of training:

1) to require in every-day work that Party members set the example by strict adherence to regulations, instructions, and orders of superiors; this is the main factor ensuring a high level of education and discipline.

2) to direct more concentrated attention on the perfection of instructing and method abilities of the non-commissioned officers and officers, and to apply sanctions not only of the service but also Party sanctions to those members of the PZPR who neglect their duties in the educational process, e.g., by passing them on to their subordinates. Party organizations should take an interest in the self-educating process of officers, in their reading of the military press, and professional literature.

3) to combat the harmful forms of conducting activities which consist of far-reaching collaboration and illegal facilitating of the exercises by the commanders of subunits and units; to propagate systematically the experience gained from past exercises and to put into practice the appropriate conclusions. In this field party members should lead.

4) to show maximum concern for a systematic improvement in the combat readiness of the units.

Work of the Polish Military Institute of Hygiene and Epidemiology

/Following is the translation of an article by Maria Ulbrycht in Zolnierz Polski (Polish Soldier), No 7 (664), Warsaw, 12 February 1961, pages 10-11./

After many centuries of high regard, the Polish kitchen received a shattering blow: fatty steak might do more harm than good, we need less potatoes and more fresh vegetables, and we will find less and less fresh fruits and juices in our menus.

Listening to a lecture given by Professor Colonel Dr Maksyma Nikronowa, we realized how little time we are devoting to the proper diet.

The Military Institute of Hygiene and Epidemiology (in tribute to General Kaczkowski) is performing a group of very interesting tests to determine not only the contents of our army's pots and pans and the calories in the food, but also the soldiers' physical condition, development, and energy.

It was fifteen years ago when the Institute of Hygiene and Epidemiology, as a small field post, later as a central laboratory, and a year ago as an educational and research institute, started doing research in the army.

Work is done in five main research centers: hygiene, epidemology, microbiology, toxicology and radiobiological defense. This Institute was named after General Kaczkowski, hygienist and epidemiologist, first in command of the Polish Army Sanitary Services during the November 1930 uprising.

Vitamin research is foremost. Are soldiers getting vitamins in substantial quantities? To what extent are they destroyed by improper cooking? Are the quantities of vitamins given in army food sufficient to meet young draftees' vitamin deficiencies? When and how are such people to be given special attention?

Workers of the Institute are traveling throughout the country weighing, analyzing, and measuring very carefully, giving soldiers complete and complicated checkups. They are painstakingly collecting all data which will no doubt bring a different picture of the army's food standards in the future. Hence, in the future more than one lazy cook will be in trouble when the lack of vitamin C in the potatos is clearly shown to be the result of peeling them the evening before and letting them stand in water overnight.

We must wait for the results of this vitamin and food research, but the results of research on clothing can be easily spotted on the streets. The new and comfortable uniforms were greeted by the army with appreciation and thanks. Here, it is only necessary to mention the Institute of Hygiene and Epidemology their tests, and their accurate measurements.

The Chronoreflexograph Will Tell the Whole Truth

It looks harmless: a medium-sized box with very simple instruments, a few lights, and a cable with a special grip. The initiator and one of the developers of the chronoreflexograph (universal CEU 2) demonstrates to us its ability and functions in telling the extent of fatigue in human beings.

The patient takes the grip in his hand and the moment he sees a light go on in the box, he presses the grip. The reflex speed, noted in one thousandths of a second, will show the fatigue stage of a patient, the capability of a sick soldier's body to defend itself and what causes the fatigue. The instrument will be responsible for certain changes in the design of military vehicles. How long is it possible to drive in difficult terrain? What influence will a long stay in army tanks have on the system? How is fatigue reflected by the interest of a person in his work? The chronoreflexograph will give answers to all these and many more questions.

The chronoreflexograph is one of the many very interesting installations in the Military Institute of Hygiene and Epidemology. There is always something new; for instance, there is an original ball to measure the quantity of bacteria in the air and there are apparatus showing the degree of radioactivity, special analytical instruments...Even the placement of a cabinet, installation, or ventilator has a special purpose and sense. Engineering, biology, and medicine at the Institution are merged in a single unified organization.

Mythology About Group O

The average human being knows that there are blood types A and B. There is also a special type O which can be used universally. Dr. Julian Biela's lecture on dangerous blood donors was to me a true revelation.

The Institute of Microbiology was given a special assignment to analyse accurately donors with group O blood to determine why, after certain transfusions, patients went through great shock. Painstaking, tedious tests brought truly unusual and interesting results. There are many factors in the donors which can play a big role in changing their blood, unnoticable changes which might even cause the death of a patient. For example, a donor may have had a transfusion performed on him that could cause danger in the future.

Females with group O who went through a heterogenous pregnancy (conflict between the mother's blood and placenta) are also a source of danger. Sometimes, as shown by the latest tests certain vaccinations reflect on the donor's blood. We must recognize the danger in order to prevent it. Much work has been done in this field; thanks to it, the Institute can easily spot a dangerous donor. It is needless to say how valuable this is for the army

and for humanity. The Military Institute of Hygiene and Epidemology can be proud of its interesting work. Its quality is best reflected in the 74 educational publications, the doctorate examinations of many young educators and the yearly institute publications.

Sentiments about Worms and Mosquitos

A visit to an institute of knowledge influenced us and re-evaluated some thoughts and feelings. You might wonder: can one be happy from a mosquito bite or from a worm getting into a flower pot?

No doubt no one has been as concerned about mosquitos as the Institute. They erected special cages which were supplied with warm blood; when the mosquitos refused to suck except through mammal skin, the Institute even brought bat wings for them. All this was done to help the soldier, who is always vulnerable in the open or in the woods to mosquito bites. There is no argument as to the type of mosquito which carries malaria, but here is a new revelation: it was discovered that mosquitos also carry in their organism a virus, which can cuase meningitis.

In tropical countries mosquitos are carriers of yellow fever bacteria. However, the quantity of the latter which exist in human blood is so minimal that they affect only the body and because of this can serve as a vaccine against yellow fever. Our specialists' experiments indicate a similar phenomena in the matter of meningitis. Research in this field is still going on and it is not permissible as yet to announce the findings as completely successful. If they are true, however, the ordinary mosquito may develop into a positive hero.

Gaining fame as experimental bugs are white flowerpot worms, the plague of the many stores and cellars, grain weevils, and Maczniki, used for many bacteriological tests and experiments, acting as poison degree indicators. In the field, Jetki Larwa (dragon-fly larva) is a very good indicator of water pollution and poison.

It is the aim of toxicology to halt and prevent any dangers of poison, to test new equipment, and to find syntheses of chemical methods for the prevention of radioactivity and the study of its properties.

On the grounds of the Military Institute of Hygiene and Epidemiology, there is a simple monument to Gen Karol Kaczkovski. Every day, white-clad technicans pass by with their minds on nothing except finding vitamin O, why a new generation of mosquitos would not eat, or the installation of new equipment for radioactivity research.

The brave General-Epidemiologist fought 130 years ago against cholera, which devastated the ranks of soldiers. Today the fight is continuing by his successors with more modern equipment.

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Awards of the Minister of National Defense for Work Connected with the History of Polish Arms, Contemporary Military Life and Defensibility of the Country

[Following is the translation of an unsigned article in Rocznik Wojskowo-Polityczny 1959 (Military Political Yearbook 1959), No 1, Warsaw, 1960.]

12 October 1959, on the occasion of Polish Military Forces' Day, the Minister of National Defense, General Spychalski, on the suggestion of the Commission for Awards and Stipends of the Ministry of National Defense granted the following awards and distinctions for work connected with the history of Polish arms, contemporary military life, and the problems of national defense.

In the field of operational art, an award of 30,000 zlotys was given to the following group of officers: Lieutenant Colonel Konstanty Myszlon, Lieutenant Colonel Eugeniusz Bejgier, Colonel Jozef Stachowski, Major Marjan Kozirski, Colonel Stanislaw Cybulski, Colonel Walenty Litwa.

In the scientific-technical field, an award of 30,000 zlotys was given to the following group: Major Engineer Czeslaw Ochwat, Captain Engineer Zdzislaw Knapp, Captain Engineer Jozef Nobis, Magister Engineer Zbigniew Zarnowicki.

For literary work an award in amount of 30,000 zlotys was given to Waldemar Kotowicz for the book Front Ways; a distinction in amount of 10,000 zoltys was given to Henryk Hubert for the book Lenino.

In the history of wars and the military field, no awards were given this year; instead, a distinction in amount of 20,000 was given to a group of co-workers of the Institute for the History of the Party at the Central Committee of the United Polish Workers' Party. This was comprised of the following persons: Edwarda Markowa, Hanna Bortnowska, Bogdan Hillebrandt and Ryszard Nazarewicz. The distinction was given for the publication, Announcements of the Commander-in-Chief of the People's Guard and the People's Army, and a distinction in the amount of 10,000 zlotys was given to Zbigniew Flisowski for the publication Westerplatte.

Distinctions in amount of 5,000 zlotys each were given to the authors of the following memoirs:

1) to Jerzy Lyzwa, for the book Od Wisloka do Czarnej Elstery (From the Wislok to Czarna Elstera);
2) to Stanislaw Truszkowski, for the book Moj Wrzesien (My September);
3) to Gustaw Alef-Bolkowiak, for the book Gorace dni (Hot Days).

Distinctions in amount of 5,000 zlotys each were given to Lieutenant Colonel Janusz Przymanowski and Lieutenant Colonel Zbigniew Zaluski for publication activities connected with the history and present activities of the Polish People's Army.

In addition to this, four stipends were awarded to historians and literary writers who are working on the history and contemporary life of the Polish Armed Forces.

Announcements of the Chief Commission for Invention and Rationalization

At the meeting of the Chief Commission for Invention and Rationalization which took place in April 1959, two works were considered and accepted.

1) Technical improvements connected with firearm practices. The authors of this project, Captain Jan Gosso, Lieutenant Ryszard Grel, and Sergeant Henryk Socko, were given an award of approximately 30,000 zlotys to divide among themselves according to how much work each did on the project.

2) Technical improvements connected with distributive tables for supply stations. The authors of this project, Captain Stanislaw Pikulski, Captain Stanislaw Renks, Citizen Zygmunt Pekala, and citizen Jerzy Orlowski, were awarded an award of approximately 10,000 zlotys to divide among themselves according to how much work each did on the project.

For diligent work in making practical applications of the works mentioned above, a premium of 2,500 zlotys was given to Lieutenant Colonel Witold Witkowski; a premium of 5,000 zlotys was given to Major Stanislaw Banasiak.

At the meetings of the Chief Commission for Invention and Rationalization which took place between August and November 1959, the following invention projects were accepted and confirmed from those considered.

1) A paper entitled An Arrangement for Transporting Wounded on Trucks. The authors of this project, Major Edward Czaplinski and Citizen Boleslaw Galas, were given an award of approximately 6,000 zlotys.

2) A paper entitled Mattress for Guardroom Bunks. The author of this project, Captain Zygmunt Mucha was given an award of approximately 3,000 zlotys.

3) A paper entitled Gas Generator. The authors of this project, Captain Jozef Biercy and Citizen Zbigniew Hulewicz, were given an award of approximately 4,000 zlotys.

4) A paper entitled Modernization of Oxygen Masks. The authors of this project, Lieutenant Colonel Stanislaw Basista and Captain Czeslaw Kolodziejski, were awarded 9,521 zlotys from the yearly savings, which amounted to 146,000 zlotys.

5) Technical improvement connected with disposition tables for radio communications. The author of this project, Captain Franciszek Grebski, was awarded an amount of approximately 18,000 zlotys.

For diligent work in making practical applications of the above technical improvement, Captain Adam Wilkosz, Master Sergeant Edward Michalski, and Citizen Boleslaw Caban, were given a premium in the amount of 4,500 zlotys.

6) An invention entitled "Anti-corrosion measure W." The author of this project, Magister Engineer Tadeusz Czarniecki, was given an award of 29,000 zlotys from the yearly savings which amounted to 436,000 zlotys.

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Some Problems Of Tactical Maneuvering Of A Ship Group

[Following is the translation of an article by Capt. (Navy) Edmund Kosiarz in Przeglad Morski (Naval Review), Vol XIV, No. 1 Gdynia, Jan. 1961, pages 15-32.]

The proper battle maneuver of a single ship and of ships forming a group is an important element in the complex of battle activity, especially in modern conditions of naval combat, because of the possible use of nuclear weapons, the introduction of many modern means of observation and communications, and the increased speed of ships, has undergone and important change. Equally changed is the configuration of battle formations and groupings of ships (increased distances) and, in this connection, the means of forming (such formations or groupings). The principles of maneuvering a ship group heretofore used are not sufficient; equally insufficient are the intragroup communications based on the traditional visual means. Because of the above considerations it is worthwhile examining the most effective and most proper maneuvering of a group, as it is worthwhile considering the possibility of introducing certain changes in the principles of forming the combat formation and in communications between the units of the group.

Role and Importance of the Flagship in Accelerating the Maneuver of the Group.

The principle is binding in many navies that all maneuvers of the group are carried out relative to the flagship. The maneuvering ships disregarding suitability and time the maneuver relative to the flagship which keeps a steady course and steady speed. In the majority of cases the position of the flagship is not convenient for choosing this ship as the directional ship, so that the duration of the maneuver operation is prolonged. For example, the re-grouping maneuver of two ships from column formation to line formation (Illus. 1a), with a distance between ships of 25 kbl, in which the flagship diminishes speed to "half" and the other ship increases its speed to maximum, will last 20 minutes. When the flagship does not diminish speed, this same maneuver will last 41 minutes. [Note: Illustrations follow at end of text.] Taking position on the beak of the course angles of the flagship will take considerably longer. For example, the forming of an inverted wedge formation from a column formation by the method "relative to the flagship" will take the second ship 37 minutes and the third as long as 56 minutes (Illus. 2a). The disadvantages of the method of maneuvering "relative to the flagship" manifest themselves especially in the time necessary to re-group the ships after a battle.

The flagship then keeps to its course and speed, the other ships increase their speed to maximum and began their race, which sometimes lasts for hours, to take up their positions (Illus. 3a).

In the example cited, the most distant ship will take up its position only after 100 minutes. In this case the long-lasting maneuver will detrimentally affect the organization of the defense of the group, since an effective defense is possible only in the established formation after all or the majority of ships have been re-grouped.

If, however, the flagship also takes part in this maneuver, all the re-groupings will be carried out in a considerably shorter time.

In the first example (Illus. 1b), when the maneuver is carried out according to the principle that not the rear ship but the flag (front) ship will maneuver for the purpose of occupying a new position, the re-grouping will last only 8 minutes. The forming of an inverted wedge formation from a column formation carried out according to the principle of "the flagship maneuvers" relative to the rear ship, will also take 8 minutes, and relative to the middle ship 10 minutes. Previously, however, the time for composing this formation was 56 minutes (Illus. 2b).

Taking up the formation after a battle, when the flagship also maneuvers, will take muss less time -- only 30 minutes instead of 100 (Illus. 3b).

In the examples cited all ships maintain either "full" speed or assigned speed.

Thus, in applying the principle of "the flagship also maneuvers", we shorten the maneuver time by 1/3 to 1/5. It is possible to use the proposed method in numerable, often-met variations of maneuvering a ship group. After a battle, the assembling of the ships and the forming of a cruise formation of the group is carried out in one maneuver. In this maneuver the flagship takes an active part, which makes it easier for the other ships to take up their positions in a considerable shorter time, avoiding a damaging, long-lasting forced speed and, what is most important, it will permit in a considerable shorter time the organization of an effective defense of the group on the sea passage.

It is necessary, in particular, to examine the concept of "the place of the flagship in the formation." The old regular (line) tactics are still influential, so that even at present there exists a tendency to place the flagship at the head of the column. In column formation the flagship finds itself in front, in cruise formation the flagship is placed in front of the guard ships (in front of the whole formation). This tendency causes unnecessary delays in setting the formation, since the actual, mutual positions of the ships before taking up the formation (as, for example, whenleaving anchorage or after a battle) is not taken into account.

Meanwhile, with the modern means of communications and observation, the requirements for organizing the defense of the group in its sea passage and with the presently accepted principles of maneuvering a ship group, there is no need for the flagship to be at the head of

the formation. The command of the group can be exercised, in the majority of cases, from any freely chosen place in the formation or grouping. Besides this, it is a mistake to tie all maneuvers to the flagship. As directional ship should be assigned that ship which in the given situation has the most favorable position relative to the rest of the ships. The commander of the group is obliged to direct the maneuver and should strive for the fastest and most suitable execution of the adopted decisions, utilizing for this purpose, in as far as possible, even the flagship.

As the above examples show, the proposed method provides a considerable gain in time, which in tactics is a very important element. The advantages of these proposals are clearly shown in the re-grouping maneuver of ships from a cruise formation to a battle formation. When approaching the enemy (or the specific boundary) the group, for the greater effectiveness of all weapons (especially anti air craft weapons), is moving in a cruise formation, most often in one group. The line from which re-grouping into battle formation begins (distance of this line from the enemy) is dependent on many factors, among which the duration of the re-grouping plays an important role. Naturally, we should strive to maintain as long as possible conditions favorable for the defense of the group and we should not by a premature maneuver give away our intentions to the enemy; these things can be achieved as well by adopting the methods of maneuver proposed above. In the traditional method this re-grouping is supposed to be a lengthy maneuver and, namely, the group of guard ships re-groups itself into a column formation and moves out to the assigned position. The ships being guarded, however, alone or with part of the guard, continue to proceed on the initial course and speed (illus. 4a). For such a maneuver much time is needed. In the example shown in the illustration, despite the forced speed of the attack group, 80 minutes is lost in re-grouping. The time necessary for such a re-grouping will, however, be considerably shortened if the flagship or the whole group of ships being guarded "will help" the attack group by a proper maneuver.
Let us look into the most often met cases of such a maneuver.

Re-grouping from a Shield Formation * into a Battle Formation of Two Attack Groups (Illus. 4b).

The ship being guarded and the guard ships assigned to it (GU-1 Attack Group 1), on the signal of the flagship, carry out a simultaneous turn on a counter-course. For several minutes they pull apart from the GU-2 (Attack Group 2) which is moving out front, and next, by a simultaneous turn, this group (GU-1) puts itself on the same course, more or less, as the other group (GU-2) and holds to this course until the moment when the distance between GU-1 and GU-2 is the one required. GU-2 also with a simultaneous turn puts itself on course in the direction of the assigned position. When the distance between the groups is the one required, both groups put themselves on the previous course. While this maneuver takes place the commanders of the attack groups reform their groups into the necessary formations. This method demands the least amount of time. (* [Note] Proposed name for this formation.)

Regrouping from a Concentric Formation* Into a Battle Formation of Two Attack Groups (Illus. 5)

This regrouping is carried out on the same principle as the regrouping from the shield formation. The guarded ship and the guard ships assigned to it (GU-1) make a simultaneous turn on a counter-course, which brings them out of the formation; after that, again by a simultaneous turn, they put themselves on a course which is opposite that of the battle formation. The remaining ships, after GU-1 has left the formation, begin the maneuver to occupy the positions assigned to this group (GU-2). In this case the regrouping inside each of the groups takes place at the same time as the over-all maneuver; only when the regrouping inside the attack groups is not completed by the time the over-all maneuver is accomplished, should this regrouping take place after the maneuver. When the distance between the groups equals that required, both groups put themselves on the previous course. (*[Note] Proposed name for this formation.)

Regrouping from a Circular Formation* Into a Battle Formation of Three Attack Groups (Illus 6)

Basing on the principle examined above we can considerably speed up the regrouping from a circular formation into a battle formation of three attack groups. (*[Note] Proposed name for this formation.)

At the start, GU-1 -- which in the battle formation will be the directional group -- makes a simultaneous turn on a counter-course and goes out of the formation. It lays on this course for such a period as is necessary for the other attack groups to occupy their positions in the battle formation. This time (duration) can be earlier determined by computations for a typical cruise and battle formation. After passage of this time period, GU-1 lays on the general course of the entire group. The remaining GU-2 and GU-3, with simultaneous turns, put themselves on the courses necessary to take the positions assigned them in the battle formation. GU-2 and GU-3 may start the maneuver simultaneously or one after the other, depending on the place of the ships of these groups in the cruise formation or battle formation.

In all three cases the maneuvering ships maintain their full speed or, on the command of the flagship, increase speed to maximum.

Aside from the examples cited above, the method of "the flagship also participates in the maneuver" can be applied in many other cases of sailing by a ship group and this method will always lead to considerable gain in time and thus achieve a considerable tactical advantage.

Sailing in a Group

As we have already noted, the modern conditions of sailing, which are characterized by complicated formations, great speeds, the need for frequent regrouping of formations and, in particular, by the need for always taking into comsideration the possibility of the surprise use of weapons by the enemy, demand the introduction of a number of changes and improvements which have for their purpose the shortening of maneuver time to a minimum.

Turn by Means of Division

The turn by means of division, permitting the individual ships to change course by an arbitrary angle, is adopted quite often. However, this method has certain disadvantages, is difficult to accomplish, and is also dangerous, for the ships may intersect courses and come dangerously close to one another. For these reasons, when sailing at night or in conditions of poor visibility, this turn is not recommended. Another negative feature of this turn is that the maneuvering ships have to travel different distances. Thus, some ships must cut speed to "small," and sometimes even to "slow," while other ships have to increase their speed to maximum and even then some of them do not manage to take up their positions in time and are forced to a long-lasting forced speed, thus lengthening the time of the turning maneuver.

However, after analyzing the above turn, certain possibilities of simplifying and speeding it up make themselves evident, namely, by introducing certain changes in the old principles. The ships being guarded begin their turn after the ships closer to the center of the formation (guard ships) have passed half the distance necessary for the maneuver and not, as it was done until now, after they have passed the whole distance. In this case the turn of the formation will be worked out relative to the turn of the directional ship and the guard ships nearest to it or to the center of the formation. After the formation divides itself for the turn, the guard ships receive new tactical numbers and begin to maneuver to occupy new positions as is the case in the old method. The proposed changes in the principles of turning permit avoidance of the shortcomings characteristic of the turn by means of division. All the guard ships will accomplish the turn to one side, in concert with the turn of the ships being guarded, which will simplify the maneuver and eliminate its danger. The courses of the guard ships will not come near the courses of the ships being guarded and the distances between the guard ships will remain more or less the same and will differ only slightly from the differences between the ships being guarded. Aside from being safer, a maneuver carried out in this way takes less time. Illustration 7 shows the superiority of the proposed new method of turning by division to the old method.

A turn by means of division on counter-course may also be carried out by the method shown above. The ships being guarded travel a distance equal to half the distance traveled by the guard ships closer to the center of the formation and there begin their turns. The proposed method cuts more or less to half the time of the maneuver. Aside from this, during the time of re-forming, the ships being guarded do not go outside the range of the hydro-acoustical stations and the defense against submarines is not being disturbed.

Turn by Means of Wheeling

When sailing in shield formation the most frequently suitable turn is the turn by mears of wheeling. This turn is simplier and safer to carry out, but has also certain disadvantages, namely: it takes too long and creates the need for prolonged forced speed by the outer ships. For example, a guard ship on the outer rim moving at an angle of 90°, with a distance from the center of the formation of 30 kbl, at a speed of 24 knots (full speed ahead is 18 knots), needs the following time to take up the new position (in the shield formation on the new course): on a turn of 50° -- 27 minutes, on a turn of 70° -- 42 minutes, and on a turn of 90° -- 60 minutes. By introducing into this wheeling turn several changes it is possible to horten the time of the maneuver without affecting the safety of the turn. The outer guard ships do not go to the line of turn with the previous course -- as is the practice at present -- but instead make a turn on half of the required angle of course change $\frac{\alpha}{2}$, or they put themselves in the direction of the critical point which lies on the line of the course change at a distance of 10-12 kbl from the ships' turning point. On passing this point the guard ships, without changing course, proceed to the line of their new courses, after which they put themselves on this new course and take their places in the formation (Illus 9). In this way, when the angle of turn (of the whole group) is not large, the outer guard ships should, as soon as the turn signal is given, change their course by half of the intended angle of change of the entire group, increase speed, and proceed to the line of change of the entire group. When the angle of course change is large and there is danger that the guard ships will come too close to the ships being guarded, the outer ships change their course by half of the critical angle of turn $\frac{\beta}{2}$ which, as is shown in Illustration 9, is computed from the formula:

$$\sin\left(45^\circ - \frac{\beta}{2}\right) = \frac{AL}{R\sqrt{2}}, \text{ where:}$$

R = the radius of the shield formation; AL -- the distance of the critical point from the turning point of the ships being guarded.

When: R = 25 kbl; AL = 10 kbl; β = 57°.
R = 30 kbl; AL - 12 kbl; β = 57°.
R = 30 kbl; AL = 10 kbl; β = 63°.

When the ships being guarded do not move in column formation, but some other formation, then the critical point lies at a distance of 12 kbl from the turning point of the outer ship.

Table 1 permits an appreciation of the advantages of the new method of turning (The table gives the time of turning of the outer guard ships by means of wheeling in minutes. Full speed -- 18 knots, maximum speed of the guard ships -- 24 knots, distance of the nearest guard ship from the center of the formation -- 30 kbl. The ships being guarded move in column formation).

TABLE 1

Amount of Course Change (degrees)	According to the Principles Now in Force		According to the Proposed Principles	
	Course Angles of the Outer Guard Ships			
	45°	90°	45°	90°
30	11	16	9	13.5
50	20	27	15.5	19.5
70	30	42	19.5	23
90	43	60	24.5	25

As can be seen in the table, this new method shortens the over-all time of the maneuver by 1.5-2 times, which is evidence of the suitability of adapting it in practical sailing.

Establishing a Formation When the Guard Ships Are Ahead of the Ships Being Guarded

Re-grouping from column formation in which the guard ships sail ahead of the ships being guarded is carried out according to the following principle. On signal the guard ships make a simultaneous turn on the required angle, increase speed and, after taking up their positions, sail on the previous course and diminish speed to that required. This is very easy in setting the shield formation, since the majority of ships will take up their new positions in a short time. However, when taking up a concentric or eccentric formation, the majority of ships have to carry out a turn at a larger angle and increase their speed to maximum or diminish speed. The quickest method of formation is in the case

where all the guard ships maneuver simultaneously and occupy their positions in the shortest time.

This method, however, may cause the ships to come dangerously close to one another. For this reason it is advisable to apply a method which both maintains the safety of the maneuver and at the same time also speeds it up, namely: establishing for all the guard ships (except the forward and end ships in the formation) a turn of 90°, and those guard ships which occupy the after positions (relative to the formation) should begin maneuvering to occupy the new positions in the shortest possible time.

The method of forming the formation will be as follows (Illustration 10): the directional ship proceeds on steady course and with steady speed; the end guard ship diminishes its speed, or even -- when there is need for a considerable increase in the distance between it and the directional ship -- makes a turn on a counter-course; when the required distance (between the end guard ship and the directional ship) has been achieved, the end guard ship puts itself on the previous course and takes up its position in the formation. The lead ship will only in the majority of cases diminish speed, keeping a steady course, until the required distance has been reached. The remaining guard ships make a simultaneous turn of 90° (the even numbered to the left and the odd numbers to the right) and increase speed to maximum. After coming out on the line of the courses they independently put themselves on a steady course and, observing the position of the directional ship, occupy their positions. For the most part they will have to diminish speed, but after occupying their positions they will increase speed to the required. The guard ships which occupy positions at the head of the formation (illustration 10, ships 2 and 3) maneuver with maximum speed in order to occupy these positions in the shortest possible time. This principle will considerably speed up the re-grouping, preserving at the same time the uniformity and complete safety of the maneuver.

Re-grouping Ships From Column Formation Into Other Formations and Back Again

Such re-grouping should also be carried out under the concept "the flagship also maneuvers."

Re-grouping From a Column Formation Into a Wedge Formation (Illustration 11)

The lead ship becomes the directional ship (the lead ship of the pair becomes the directional ship when the formation being created is a wedge formation with pairs). An appropriate signal is given for the distance to be maintained between ships (in a pair wedge -- between the lead ships of the pairs) of the wedge formation. As soon as the signal for execution is given, the second and third ships increase speed to

maximum and as quickly as possible occupy their positions in the wedge formation (Illus. 11 a). The same formation is also possible with the middle ship made the directional ship (or the lead ship of the middle pair). In this case the lead and rear ships maneuver, occupying their positions in the shortest possible time (Illus. 11 b). Whether to adopt one or the other method will depend on the distance in the column formation, the form of the wedge and the position of the shops in the wedge formation.

Regrouping from a Column Formation into an Inverted Wedge Formation (Illustration 12)

The rear ship become the directional ship. The distance to be maintained between the ships in the inverted wedge is given. On the signal of execution, the middle and lead ships proceed at maximum speed and take up their positions in the new formation in the shortest possible time.

Regrouping from a Column Formation into a Rhomb Formation (Illustration 13)

This regrouping is most conveniently carried out according to the principle of forming a group with circular defense. The rear ship becomes the directional ship. A signal is given that the formation will be carried out as a shield formation with a radius equal to the distance of the directional ship from the center of the formation. On the signal of execution, ships 1 and 2 maneuver according to the principles established for the formation of a shield formation which were discussed above; ship 3 makes a turn of 40°.

Regrouping from a Column Formation into a Square Formation (Illustration 14)

The simplest and quickest way of doing this is by a simultaneous turn on previously calculated angles. The ships with tactical numbers 1 and 3 make a simultaneous turn to the right; those with tactical numbers 2 and 4 make a simultaneous turn to the left. The regrouping will be accomplished quickest when ships and 3 make a turn of 120°, and ships 2 and 4 make a turn of 60°. There are also other possible combinations of turning angles.

Regrouping from a Wedge Formation, Inverted Wedge Formation, Rhomb Formation and Square Formation into Column Formation (Illustration 15)

These regroupings are carried out on the signals from the flagship. Each ship is assigned by the flagship its order of entering the column formation. However, the establishment of fixed rules for such regrouping

(order of entering the column formation, and which ship should become directional) is not desireable, for the most favorable conditions of maneuver will depend on the situation. It is only possible to recommend adoptation for such regrouping the principles of fast maneuvering and to recommend the assignment as directional ship that ship relative to which the regrouping will be carried out in the shortest possible time.

For example, taking up a column formation from an inverted wedge will take less time if the rear ship is assigned as directional ship. In this case the flank ships (those on the extreme ends) should step in after the directional ship into the column course (Illus. 15 a), eventually one steps out front, and the other after it in the column course (Illus. 15 b).

Increasing the Distance Between Ships in Groups and Formations

In general, the rules for increasing the distance between the ships in some simple formations are well established. H wever, certain of these rules can be changed so that the maneuver of increasing the distance between ships can be speeded up. The basic principle of the maneuver to increase the distance between ships in a formation should be "manuever must be carried out in the shortest possible time." Let us examine the most rational principles of these maneuvers in the following formations: oblique formation, line formation and column formation, as well as wedge formation, inverted wedge formation, rhomb formation and square formation. Basically these principles are as follows:

The maneuvers are carried out at maximum speed;

The relative positions of ships in the formation may be violated;

The distance to be achieved by the maneuver is calculated between the closest ships in the formation, but when the maneuver is carried out in pairs, the distance to be calculated is that between the pairs.

Increasing the distance between Ships in an Oblique Formation (Illus. 16)

With two ships, both make a turn in opposite directions on courses equal and opposite to the slope of the formation and then proceed until they reach the distance required (Illus. 16a).

With three ships (Illus. 16b), the extreme [flank] ships make the same turns -- opposite one another and parallel to the slope of the formation -- and proceed until they have reached the required distance. The middle ship makes a turn on a course perpendicular to the slope of the formation (actually, the ship makes a complete turn of 360°).

With four ships (Illus. 16c), the flank ships make the same turns -- opposite one another and parallel to the slope of the formation -- and the middle ships make turns opposite one another and perpendicular to the slope of the formation (one of the middle ships makes a turn of 360°). All of the ships then proceed on their courses until the required distance is reached.

With five and six ships the maneuver to increase distance is carried out in pairs on the same principle as with three ships (Illus. 16d).

With seven or eight ships the maneuver is carried out in pairs on the same principle as with four ships (Illus. 16e).

In maneuvering with pairs, the ships of the pair make either a simultaneous turn or they turn one after the other, depending on the situation.

Increasing the Distance in Line Formation

The line formation, as is known, is a particular case of the oblique formation, thus is based on the same principles. The flank ships make a turn of 90° and the middle ships either proceed on the previous course or put themselves on a countercourse (actually making a turn of 360°) (Illus. 17a, b, c, d, and e).

Thus, all the maneuvers increasing distance between ships in simple formations, as described, are carried out on the same principles. The re-groupings should be easy to carry out and the maneuver should be safe.

Increasing Distance in the Following Formations: Wedge, Inverted Wedge, Square, and Rhomb Formations

The maneuvers should be carried out on the same principle as in circular formations. On the signal of execution, all ships move away from the center of the formation and increase the distance to that required. This method of maneuvering makes it possible to increase the distances independently of the course of the whole group, wven when the group as a whole executes several simultaneous turns.

As the point of intersection of the two axes it is best to take the center of the formation. In a wedge and inverted wedge formation this point is found somewhat arbitrarily. In the square formation and rhomb formation the center is easily found (Illus. 18, 19 and 20).

There are binding instructions as to how a ship should leave a column formation. In present conditions of sailing, however, there should be no strict rules as to whether the ship should leave to the right or left side. The maneuver should be carried out as is best in the given situation, by taking into account the navigational conditions, passing ships, etc. The flagship, after taking into account the given situation, should then decide on which side the ship should leave the formation and then give the appropriate signal.

Using UKF* for Radio Communication in the Group

(*UKF - USW, ultrashort waves)

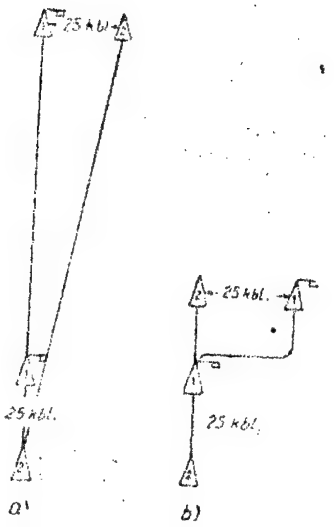
There are two contradictory views on the use of UKF in naval communications: one stresses the need of the immediate transfer of orders and announcements in widely dispersed formations and in all

conditions of sailing; the other stresses the need for concealment. Modern formations, consisting of many ships which maneuver with great speed and with the need that all the ships begin their maneuvers at the same time, need excellent and foolproof communications. The transfer of signals by visual means will be insufficient. The one sure and foolproof means of commanding a maneuvering group is by UKF radio communication, which guarantees the sending of signals in conditions of good and bad visibility/ Radio concealment could be assured by introducing certain changes and rules (there are cases when an obligatory radio blackout is binding). The range of a UKF radio station is more or less equal to the geometrical distance to the horizon, and the range of a gauging (or directional) radio beam is 1.5-2 times greater. Thus, it is possible to begin transmitting on UKF from a distance of 20-25 miles. (We exclude the case in which radio waves extend themselves beyond this range and the case in which the radio waves are directed from points located at great altitude as, for example, from airplanes.) The distance of 25 miles will not exceed the distance between the opposing sides (in battle) and is less than the distance of radar contact. When one takes into account that the distance between ships engaged in artillery battle is now 20-25 miles, and with the use of rockets this distance will considerably increase, and when it is taken into consideration that the enemy ships will first be detected by radar, the concealment of UKF radio communications is quite adequate. Nevertheless, all means should be adopted to decrease to a minimum the possibilities of the enemy's listening in on the UKF radio communications.

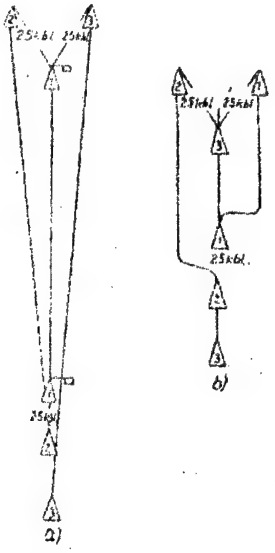
Two things can help to conceal the operation of UKF stations: shortening to a minimum the time of transmission, and the introduction of the principle of not receipting for exchanges of signals and announcements.

Since UKF is a means of commanding the group and of directing its maneuvers, on UKF are transmitted only the orders of the commander of the group (by short signals) and the announcements in his name only. Non-receipting for signals on UKF requires precise and correct organization of communications, efficient attendance of the UKF station, and good "harmonization" of the ships of the group. It is necessary, however, to point out that non-receipting for messages transmitted should be used carefully. In certain cases, for example when there are ships in the group which are not ready for it, when sailing in conditions of poor visibility, when passing ships, etc., the group commander may require receipting for signals and, when if he finds it necessary, their repetition. Aside from this, a strict control should be kept on the transmittal of messages [signals] so as to exclude the possibility of not receiving the signals by the addressees or of orders given in the messages being carried out improperly.

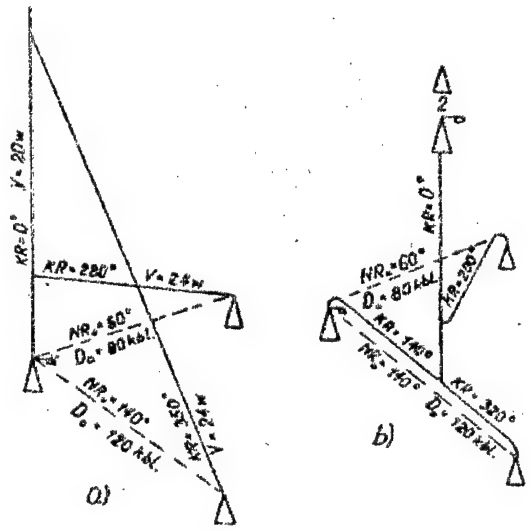
[Illustrations mentioned above follow.]



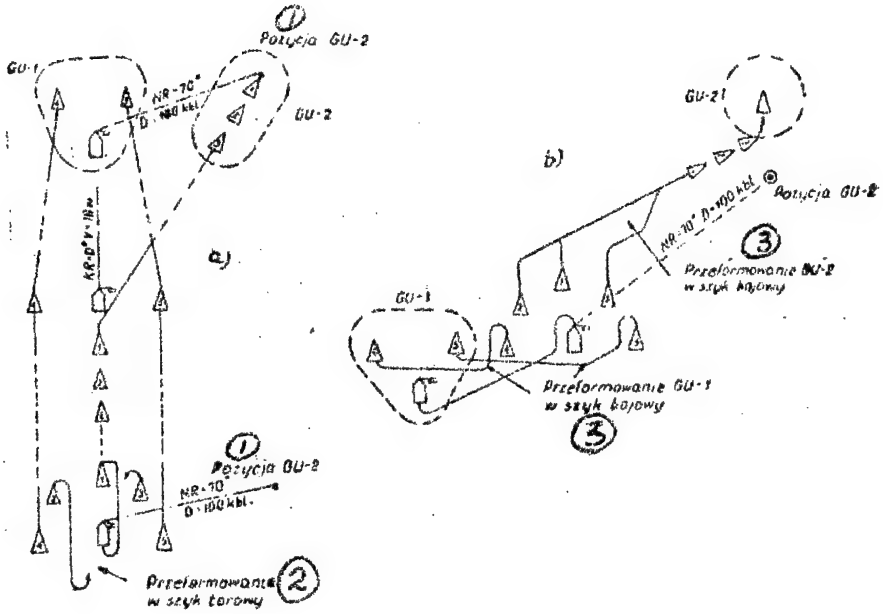
Illus. 1. Re-grouping From Column Formation into Line Formation.
a) By the rules now in force;
b) By the proposed rules.



Illus. 2. Re-grouping From Column Formation into Inverted Wedge Formation
a) By the rules now in force;
b) By the new rules.

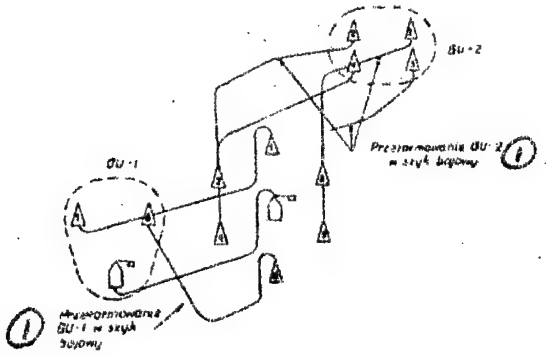


Illus 3. Taking Up Formation After Battle
a) By the rules now in force; b) By the proposed rules.
KR = Course; NR = New Course; V = Speed; D_o = Distance; w = knots.



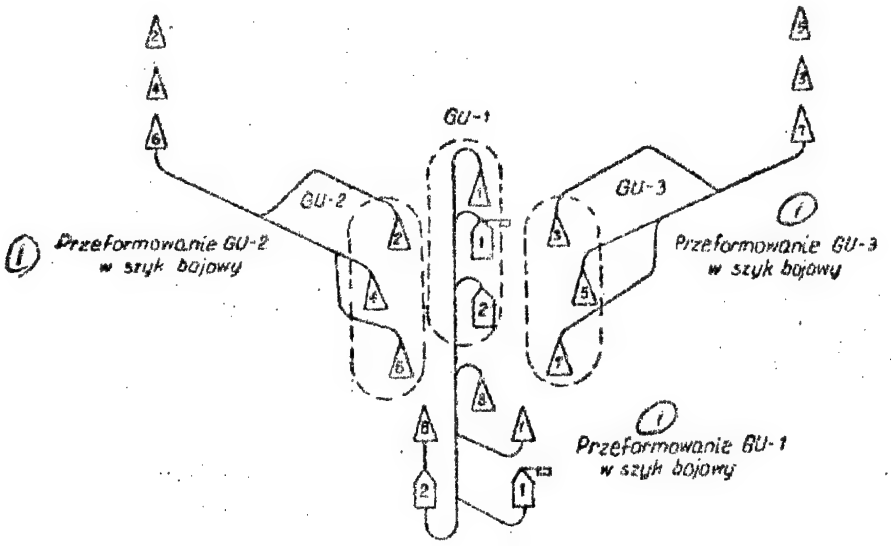
Illus. 4. Re-grouping from Shield Formation into Battle Formation of Two Attack Groups

a) By the rules now in force; b) By the proposed rules. Abbreviations same as Illus. 3. Also: 1) Position of __; 2) Re-grouping into Column Formation; 3) Re-grouping of __ into Battle Formation.



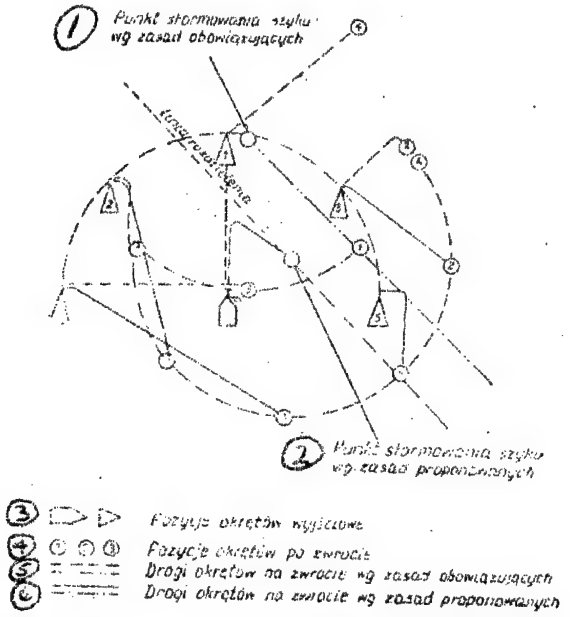
Illus. 5. Re-grouping from a Concentric Formation into a Battle Formation of Two Attack Groups

1) Re-grouping of __ into Battle formation.



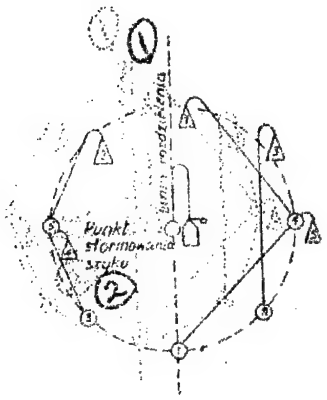
Illus. 6. Re-grouping from Circular Formation into Three Attack Groups

1) Re-grouping of ___ into Battle Formation.

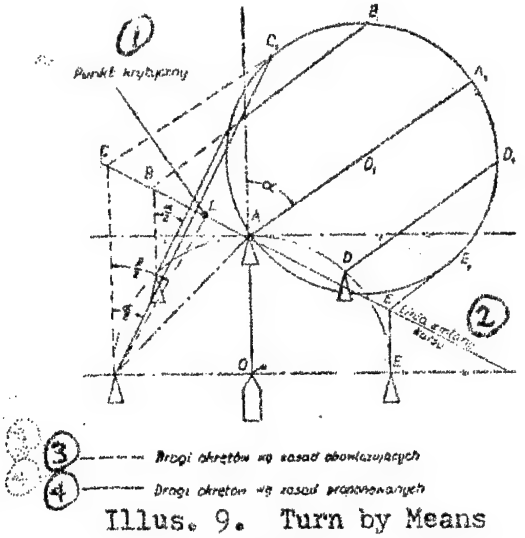


Illus. 7. Turn by Means of Division

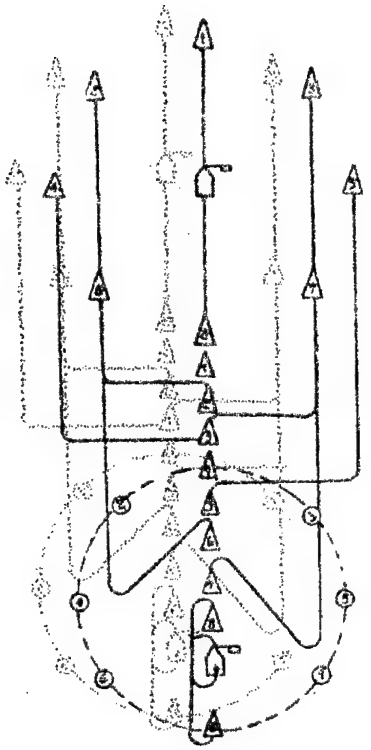
1) Point of taking up the formation according to the present rules; 2) Point of taking up the formation according to the proposed rules; 3) Position of the ships when leaving; 4) Position of the ships after the turn; 5) course of the ships on turning (rules now in effect); 6) course of the ships on turning (proposed rules).



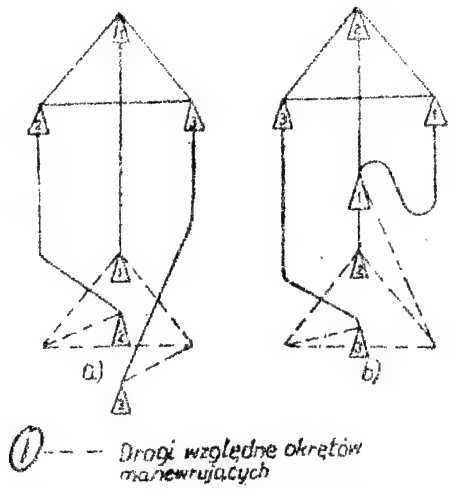
Illus. 8. Turn on Counter-course by Means of Division
1) Line of Division; 2) Point of Taking up Formation.



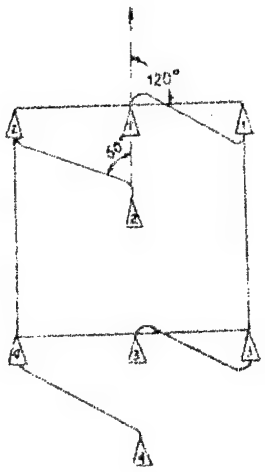
Illus. 9. Turn by Means of Wheeling
1.) Critical point; 2)Line of course change; 3) course of ships (rules now in force); 4) course of ships (proposed rules).



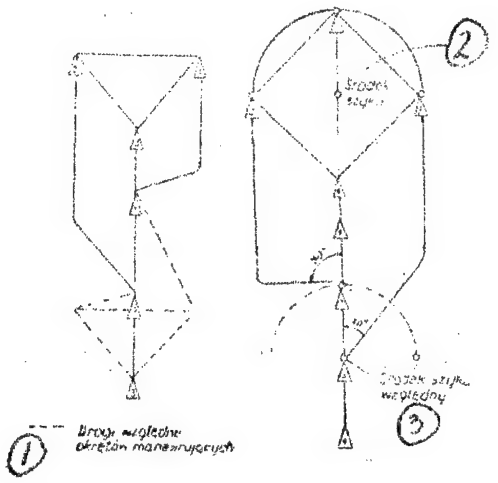
Illus. 10. Taking up a Formation When the Guard Ships Are in Front of the Ships Being Guarded



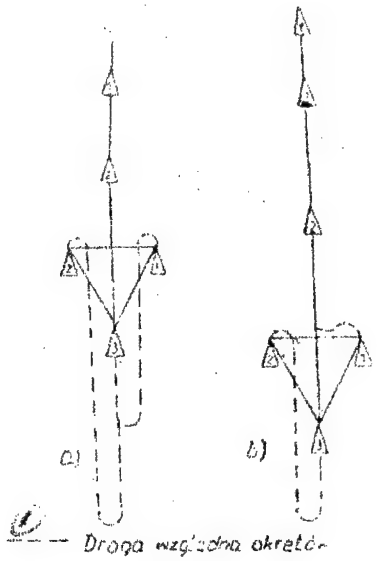
Illus. 11. Re-grouping from a Column Formation into a Wedge Formation. a) Lead ship is directional; b) Middle ship is directional; 1) Relative courses of the maneuvering ships.



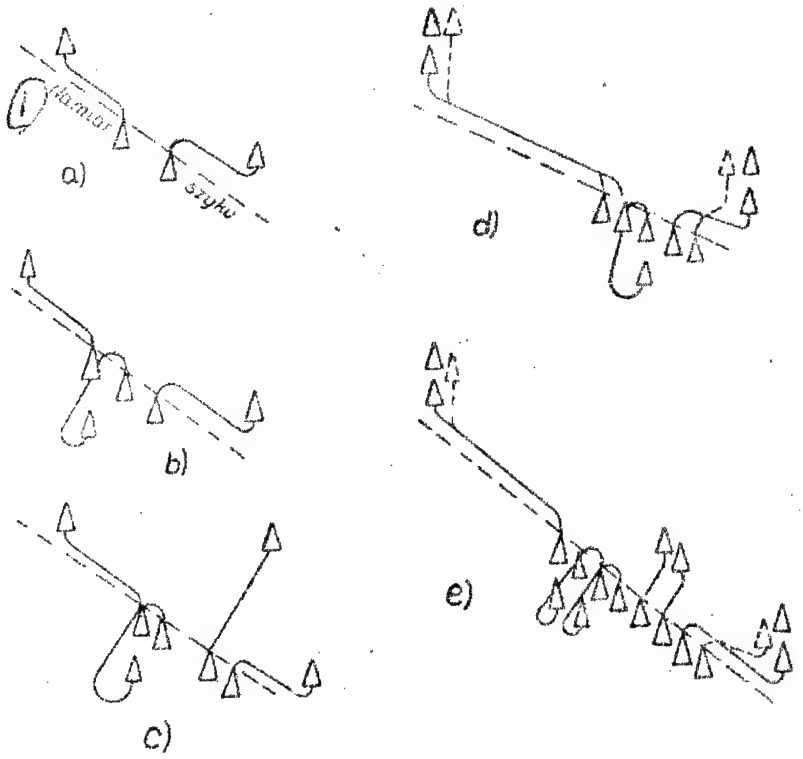
Illus. 14. Re-grouping from a Column Formation into a Square Formation.



Illus. 12 and 13. Left: Re-grouping from Column Formation into an Inverted Wedge Formation. Right: Re-grouping from a Column Formation into a Rhomb Formation. 1) Relative courses of the Maneuvering ships; 2) Center of the Formation; 3) Relative center of the Formation.

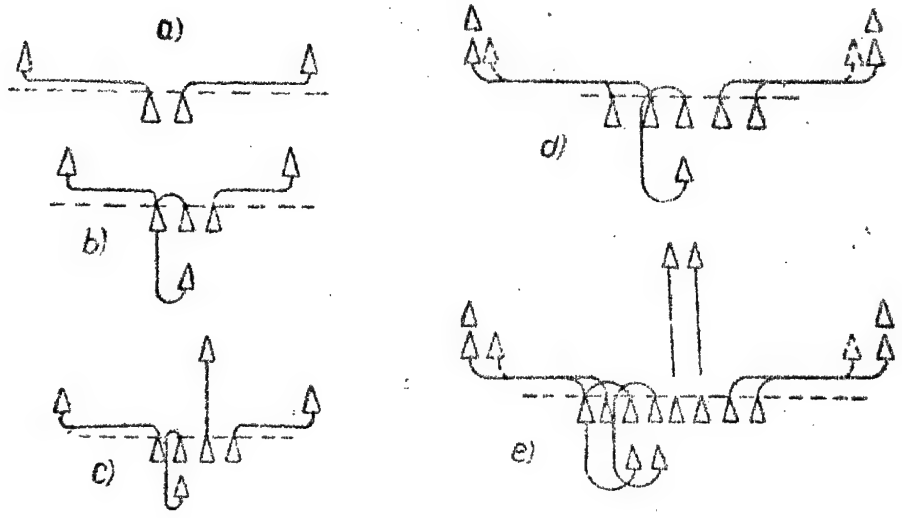


Illus. 15. Re-grouping from an Inverted Wedge Formation into a Column Formation.
a) Flank ships become center ships;
b) Center ships remain center ships
1) Relative courses of the ships.

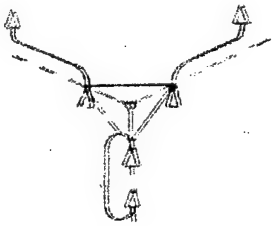


Illus. 16. Increasing Distance in an Oblique Formation

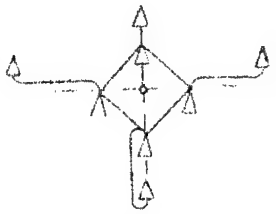
1) Slope of Formation.



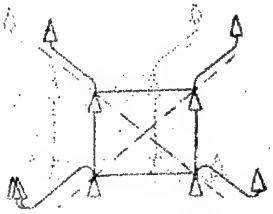
Illus. 17 Increasing Distance in Line Formation



Illus. 18. Increasing Distance in an Inverted Wedge Formation



Illus. 19. Increasing Distance in the Rhomb Formation



Illus. 20. Increasing Distance in the Square Formation

10,135
CSO: 1564-S

Polish Sport Aviation in 1960

[Following is the translation of an article by Jerzy B. Koneiczny in Wojskowy Przeglad Lotniczy (Military Aviation Review), Vol XIV, No 1, Warsaw, Jan 1961.]

As a result of a resolution passed by the Aeroclub Head Administration of the Polish People's Republic, our sport aviation began in the past year working toward a new system of schooling and training. These principles are pointing toward new activities of sport aviation and indirect support of the Air Force.

Air Force Preparatory Corps

Among many resolutions, the main one is that which calls to life the Air Force Preparatory Corps [LPW -- Lotnicze Przysposobienie Wojskowe], the main objective of which is the selection and preparation of candidates to the Air Force Academy. This is something entirely new, for it creates a system of educational activities for aeroclubs, striving at the same time toward its goal of a decisive and determined guidance of youths in secondary schools where candidates are prepared through a specified educational program for glider training, and from there recruited into the LPW.

The educational program of the LPW prepares candidates of aeroclubs for the Air Force Academy as shown below.

Candidates are admitted into first grade camps, where they receive their principal glider training and finish the tenth year of secondary school. This glider training is continued on a part-time basis in regional aeroclubs; at the same time, this completes the eleventh year of secondary school. After receiving their school diplomas, these candidates are admitted into second grade training camps and qualify as second grade glider pilots with aircraft training (25 flying hours). After this, they are eligible for the Air Force Academy. In both the first as well as the second grade camps, candidates receive the basic air force medical check-up.

The main goal of sport aviation is glider training for youths in secondary schools, preparing them as candidates for the armed forces officers schools. In the past year the LPW was certainly experimental;

but, judging from the results of intensive training, it can be acknowledged that the experiment was successful in many ways. This indicates that indirect Air Force support is improving; there is no doubt that in a few years the Air Force group will benefit from it.

First grade training was performed last year in two one-month semesters (July-August) at glider schools in Fordon, Lebork, Jezow, and Zara as well as in camps at Strzeblin and Elblag. Work in these camps on the whole went very smoothly. The best performances and results from tests in this sphere went to camps in Elblag and Strzeblin and the glider school in Fordon. But we cannot comment about interesting new candidates in this kind of training. It was shown that many aeroclubs could not guarantee the required number of candidates for the first-grade LPW camps from among pilots trained in the previous years. There was a group large enough to fill the first semester, and for the second semester, aeroclubs sent pilots who first finished their training in 1960. The reason for this is no doubt the selection of unqualified youths for basic training in aeroclubs in recent years. Everything considered, in spite of mistakes the Air Force Preparatory Corps gained in popularity among youths in senior classes, secondary schools, and of pre-draft age, and become a magnet for the other youths waiting to follow the air force profession.

The help received from the Air Force and OPL OK /?/ contributed much to the success of the LPW during the past year. There was not one LPW camp that did not receive help from the Air Force pilots. Besides helping to improve the equipment and economy of individual LPW camps, Air Force officers contributed a great deal in the way of education and cultural knowledge.

We must direct the attention of officers working in the Air Force Preparatory Corps to the following, which is the result of many propositions and suggestions based on LPW experience in the past years.

1) In educational programs, allowance must be made for more contacts between pupils and cadets OSL /?/ and visits to Air Force groups. The LPW camp crews agree whole-heartedly that this brings positive results.

2) General military classes must be made more attractive and alive, because studying regulations in classes tires the students. The outlook of the crews is towards executing more military forms than in the past year.

3) It would be well to supply first grade LPW camps with the uniforms and insignia of the LPW in schools in which teach LPW pupils. This would be excellent propaganda and a magnet for the rest of the youth.

Airplane Modeling

Last year was somewhat jubilant for airplane modeling. We must contribute this to the performance in June this year at the Gniezno XXV connected with the Polish Flying Models Championships, in which 224 competitors participated (90 juniors, 134 seniors). It showed the good level of better developed airplane modeling, which is carried out in the framework of the Aeroclub PRL in 600 model workshops.

The popular so-called small airplane gained acceptance officially

in the past year as a part of the program in those schools which play a major role in the polytechnicalisation of education. The PRL Aeroclub gained close contacts with the Education Ministry, Polish Scouts Group, and Soldiers' Friends League, which spread activities considerably among the youth in this field. The new program worked out by the PRL Aeroclub toward the end of the past year selects young pilots from school youth and will, no doubt, allow them to join aircraft modeling, with the overall aeronautical education of the youths and the definite liquidation of the gap which until now existed between modeling and glider sports. In the past, some of the educated model hobbyists dropped out and did not reach glider training.

The Polish model airplane sport gained a line of successes abroad in 1960; a major success was the second-place which was taken in the motor-powered category by Zygfryd Sulisz in the International Competitions in England (1-2 August 1960). Among other activities, it is worth mentioning the third place won by Stanislaw Zurada in the International Flying Hydromodels Championships in Split, Yugoslavia (15 August 1960). Last year for the first time, such titles as "Champions of Airplane Modeling" were given. The winners were Henryk Bazulewicz, Wlodzimierz Bredsznider, Jan Bury, Stanislaw Gorski, Sylwester Kujawa, Wladyslaw Niestoj, and Stanislaw Zurad.

Gliders

During the past year Polish glider circles were competing in the World Glider Competition in Cologne, GFR (4-8 June) where our gliders and pilots accomplished outstanding success, winning in most of the competitions. In the elimination they won second place in the Open class (Edward Makula) and two third places, one in the Standard class and another in the Open (Adam Witek and Jerzy Popiel). There were never such tremendous victories in the history of the Polish glider sport. Such a success is the more noticeable because these victories were won by Polish pilots on Polish equipment, such as the high-performance gliders Zefir-2 (Open class) and Foka (Standard class), constructed and produced by the Experimental Glider Institution. Our pilots and gliders met and aroused great interest among international experts from abroad and have made a big impression in Cologne.

At the same time, our second group participated in NRD championships with international entries (Schonhagen, 14-28 June), where our pilot Henryk Zydorczyk won third place and Pelagia Majewska won sixth; this we must acknowledge as a success. Further acknowledgment in this field is the admittance into the administration of the OSTIV (International Organization for Glider Technical Study) of a Polish representative, Engineer J. Bojanowski.

Compared to all the success abroad during 1959, the inside situation of Polish glider aviation was less fortunate. Our pilots won four international and eight local records, and only half of the silver, gold, and diamond glider trophies; this somewhat points to the weak growth of aviation support. It is not surprising that with LPW help to condition

better the young pilots, it should have been easy to achieve success. The best example would be the glider school in Lisie Katy, which showed the best results in 1960. Young pilots could not participate in more than one competition for the R. Bitner memorial in the annual glider competition, "Winged Poland." There were no other junior championships in the past year; the traditional Polish Glider Competitions which were to be held in Leszno in August were postponed because of atmospheric conditions. Lately, there was a great gap between the group of the best pilots and the rest of the competitors. The atmospheric conditions which dominated last year have had some influence on the training program and the gliders' performance. Beside success in Cologne, there is no excuse for the proportionately over-all low standing between year 1959 and 1960.

The Parachutist

The major performance of our parachutists in the international field was participation in the Fifth World Parachutist Competition in Sofia (7-17 August 1960). Our jumpers did not win a big success there. Of the male jumpers, the best was Lewandowski, who took eleventh place in the Individual classification. Of the female jumpers, Antonina Chmielarczyk took fourteenth place. As a team, our representation was weak and took next to last place. Triumphs were celebrated by the CSRS (Czechoslovakia), the USSR, and Bulgaria. The lack of proper equipment, bad atmospheric conditions in the training camps before the championships, and no contacts with the first-class parachutists of the USSR, CSRS, Bulgaria, and others contributed to the Polish parachutists' being of no account in last year's World Championship .

The traditional parachute championships of Poland which were held in Ostrowie Wielkopolskie in September of last year no doubt brought the country's title to the best, Cierniak; however, beyond that they were held without any revelations. To the small parachutist balance in 1960 we must mention that the strongest parachutist section in the country was the Warsaw Aeroclub, which had four local records and a triumph of 10,000 jumps.

Airplane Sport

In spite of the known difficulties of the past few years and a lack of equipment in this field, we can note activity and the first national success in many years. From the national shows, in one by the name of the Traditional Twelfth South-West Poland Flight (23-28 May), where 20 entrees participated who started on the models Junak-2 and 3 and Jak-18, victory went to a crew from the Aviation Training Center in Krosno (Wladyslaw Wojcicki, pilot and Zbigniew Wisniewski, navigator). In the Grunwald Flight, in commemoration of 550 years since the battle of Grunwald, 20 planes participated.

One show in this field was the First Polish Aero-acrobatics Championship (8-10 July), in which 15 entrees participated from 12 aeroclubs using the Zlin-26 planes. This championship was at the same time an eli-

mination before the First World Aero-acrobatics Championship , which was held in Bratislava in Czechoslovakia (28 August-4 September). Champions of this show (Studencki, Kacparek, and Ackerman) represented Poland in Bratislava. We must say that our representation, which started on the Zlin-226 planes, was quite satisfactory, taking third place in the unofficial standings (after the CSRS and the USSR) against a very strong opposition from abroad. Our pilots were ahead of France, the GRF, Hungary, Switzerland, the US, and England. Individually, Polish pilots took the following places: Kacparek, 13; Studencki, 19; and Ackerman, 21. It was a very pleasant and optimistic accord, compared to the later sport aviation development in Poland. Under the conditions that our aeroclubs will now have at their disposal (long-awaited Polish plane equipment which was promised by the Sport Aviation Authority), it will be the last time that equipment of very poor condition participates in the Polish Aviation Championships in Crakow.

Balloon Sport

It was only last year during our history that the balloon sport was very active. We have at our disposal three sections, with aeroclubs in Warsaw, Katowice, and Poznan; these have a total of four balloons: "Syrena" (1,200 m^3), "Warszwa" (2,200 m^3), "Poznan" (2,200 m^3), and "Katowice" (2,200 m^3). They flew a total of 70 flights. In the year 1959-1960 they executed very intensive pilot training, organizing two theoretical courses with 35 persons graduating. In practical training in three schools, 20 pupils participated. Ten pilots finished practical training in the aeroclubs: Warsaw, five; Poznan, three; and Slask, two under supervision of Engineer Burzynski.

In the year 1959-1960 there were organized two championships for the International Fair in Poznan Trophy, in which all balloons participated.

Winners of the Poznan flight were Engineers Burzynski and Makne. In the domestic championships Engineer Makaruk won, covering a distance of 355 km (landing in the Leba vicinity). The longest distance covered was by the balloon "Warsaw" with Engineer Nowacki, landing near Szczecin and covering a distance of 420 km from the starting point. The highest altitude was won by pilot Engineer Burzynski with Engineer Mosica in the balloon "Warsaw," rising to a height of 7,000 m.

From the propaganda flight, we must mention the balloon "Katowice," which started in Ostrowa, CSRS, during Aviation Day. Balloon "Warsaw" started 22 July 1960 from the market-place before 2,000 onlookers during the Kalish Jubilee. General Raczkowski participated in one of these propaganda flights.

Two outstanding balloon pilots, Engineer Z. Burzynski and Professor F. Janik, received Montgolfier Diplomas in the past year from the FAI in Barcelona.

Summing up our sport aviation activities in the past year, we must agree that it was a year of beautiful successes in the international field and in the introduction by the Aeroclub PRL a new system of training

and schooling. Careful analysis of the mistakes and needs in the work of the Aeroclubs will help to prevent mistakes in 1961. In the view of new demands, sport aviation must direct its work more rhythmically and economically, yet more effectively in the field of schooling and sport.

10,412
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The XYZ Electronic Computer

/Following is the translation of an article by Andrzej Czarski in Zolnierz Polski (Polish Soldier), No 43 (647), Warsaw, 23 October 1960, pages 4-5./

ZAM

In the current five-year plan, there will be a mass production of such computers as "SKRZAT" and "ODRA" to guide technological process, a few new specialized computers, and "ZAM-2" and "ZAM-3." It is worthy of mention that "ZAM-3" can be used in military strategic games.

To our surprise, we were greeted with a mathematical equation. Our host, imperturbable, . tried to prove that all mathematical problems a are very simple. With philosophical concentration, reporters were scratching behind their ears. However, let us start from the very beginning.

The XYZ can compute from 650 to 4,500 additions and make computations to eleven decimal places in the ten-unit system. It can subtract with the same speed, multiply from 250 to 500 figures and divide 230. Until now, no one asked, "can it think?" Electronic computers do not think; they compute, even when they are translating languages.

All computations are executed in the same manner that a mathematican would use. Speed is the only difference. All mathematical problems such as integration, are resolved into four principal problems (addition, subtraction, multiplication, and division), and are fed into the machine by human beings.

Under supervision of Krzysztofa Moszynskiego, BA, head of research and programming laboratories, mathematical problems are coded in machine language. What does it mean when we say that the machine can compute in the binary system or triple and minus binary? Why can't it do problems in the same ten-unit system that a human uses?

With the use of the binary system, the computer can do any mathematical problem with great speed and accuracy, where a human being would be very slow. To explain the binary system and how it is performed would take too long. We need to know that any problem to be executed by the computer must first be coded in the machine language by careful programming and planning.

The XYZ is a cipher machine which can give an answer (in the binary

system); that is, execute an operation in the eleven-digit number of one milliard. This number will be shown in the XYZ by way of 36 holes representing "one" or "zero". Special programming and selection of elements guarantee that the machine will understand a problem. Is the problem fed into machine written on the paper? It is, but in a special way; that is, in the form of holes punched in a particular way on special paper tape. The number "one" will be described by a hole punched in one place and the lack of it, by a "zero."

In the binary system, the ribbon holes can be punched anyplace. Specially designed and punched ribbon enters the machine, which in turn starts computing. The computer's performance, computation, and repairs are under constant surveillance by the operators. Actually, a computer consists of several units. The paper ribbon enters the first unit, the reader, which in turn passes it into the XYZ machine, where the problem is executed and remembered. Memory is stored in one of the cells, which can be a pipe filled with quicksilver, or a magnetic drum. The pipes can store 16 answers and the magnetic drum, 8,000.

The problem of what to do with all the memory stored in one of these cells is solved by a guidance system, which gives the order to remember or execute problems; this is done in a unit called the arithmometer. The arithmometer in turn receives its information from "memory," a unit called the accumulator. Finished problems are passed into outlet, and the rest of the information is stored. The answer must be decoded from the machine language into human or mathematical terms in the decoding unit.

The XYZ, like any unit, can break down; this can happen once every three or four days. Tests are performed quite often to see if the machine is functioning properly.

Return to Realization

Looking at the XYZ, I could not refrain from the question which actually brought us here to this place. "Gentlemen, please tell us strangers the truth; will an electronic machine think?

The young scientists split into two groups, "yes" and "no." Of the "yes" group, we asked when we will have cybernetic machines. The human brain has an average of 14 million cells; that means that the machine would require 14 million electronic lamps, free of connections. Cells, lamps in solution, there are simulators which even write surrealistic verses. They do not think. For the time being this is a field for science fiction writers.

A young twenty-three-year old scientist received most of the reporters' attention because his outlook and imagination in cybernetics concerned the most realistic problems involving this Polish, modern technique. He spoke of such possibilities as expansion, youth working toward the goal of reaching the heights of cybernetics, and its dictating tempo. Once, our attention was turned toward the definition of cybernetics: it is a general study of sending, (translating information) stearing, (receiving changes of information) and examining process alike in the machine, animals, peoples, and social groups.

Therefore, cybernetics is not artificial thinking, but help in the fast thinking and movement of the human being. This is why it is a science of tomorrow, difficult to understand but very challenging with its secrets.

We left the kingdom of screens flashing with colored dots and dashes, and punctured paper tapes; a kingdom of young mathematicians and engineers, angry and troubled because of not knowing enough of this modern technique. If we succeeded in stirring our readers, we will think of our accomplishment as a success, in spite of the fact that we will not know more for quite a while because of the lack of an electric turtle in a realm whose computing speed cannot be matched by man.

The Brain Factory

The first plant in Poland to produce electronic computers began its work in connection with this important production. The Wroclaw Electronic Plant produced radio, television, then in later years electronic computers and calculators -- computing, measuring, and controlling machines such as today's famous "electronic brain." Responsible for the growth and existence of the industry in Wroclaw, the capitol of Lower Silesia, are the big educational and technical cadres in mathematics and electronics.

The "BINEG," built in Poland, is the most interesting machine. It works in the minus two system. Constructed in the Institute of Telecommunications and Radionics with the Warsaw Polytechnic /Institute?/, the conception -- worked out in 1956 -- was that of Dr Z. Pawlaka; it brought great fame for Polish science. "BINEG," an experimental machine with great value in technique and didactic, was constructed under the supervision of Engineer Lazarkowics; the machine's performance is the same as XYZ.

"BINUZ," a twin of the machine "BENIG," does not differ very much from her predecessor. Constructed by Major Engineer M. Stolarski and built in the Military Technical Academy, her functions operate in the two-circuit system, executing addition, subtraction, multiplication, division, and -- unique in Poland -- brings a number to the square.

"ZAM-2" and "ZAM-3," named for the Institute of Mathematical Aparatus, are much better than the XYZ machine, predecessor of the "ZAMS." They are under construction, and -- who knows? -- they might be mass-produced in the future.

Known USSR electronic machines are: "M-2," "BESM," "SRIELA,""URAL-1," "M-3," "M-20," "URAL-11," "KRISTAL," "POGODA," and KIJEW,"

In the Seven-Year Plan of the USSR, the opening of 22 new electronic machine plants which will produce a total value of 2 billion rubles is forseen.

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YUGOSLAVIA

Detection of ABC from Mobile Observation Stations

/Following is the translation of an article by Lt Col Dako Barac in Vojni Glasnik (Military Herald), Vol XIV, No 11, Belgrade, November 1960, pages 33-40./

Bearing in mind the known characteristics of ABC weapons, especially their capacity of directly or indirectly contaminating man and all things used by him in war (weapons, food, terrain), observation for ABC, the primary aim of which is the timely detection of existent or, better yet, incipient contamination, presents one of the most important measures of ensuring protection from ABC weapons. It is a preconditioned without which one cannot envisage successful protection from ABC, decontamination, medical preventive measures, medical treatment, etc. The whole system of ABC observation must, therefore, be organized in such a manner that it detects the ABC attack in time and notifies all units in the area concerned. In the series of problems which the observation system must handle, the most difficult, and at the same time the most important, is the detection of CBR contamination. Since the existing system of ABC observation, whose organs carry out observation from a single point, is not equipped to solve all problems which appear in connection with this in the best manner, it is absolutely necessary to seek new and better solutions. One of the latter is "mobile observation" which, it would seem, has a number of advantages in comparison to the existing system of observation.

Weaknesses of the Existing Static System of Observation

The first weakness of the static system derives from the fact that timely detection of signs of incipient contamination is difficult, sometimes impossible, to achieve by means of human sense organs alone. For this reason the system of observation, particularly a static one depending on human sense organs (sight, hearing, smell, taste, and touch), is often not in a position to discover an ABC attack in time. Thus, for instance, the detection of CBR contamination based on objective or subjective changes in the human organism results in a relatively late discovery of contamination and, consequently, in a belated application of preventive, protective, and other measures.

A CBR attack may be conducted in such a manner as to go unnoticed. This occurs in case of deposition of radioactive dust after a distant atomic explosion in the sprinkling of chemical agents or military radio-

active materials at night, or when visibility is low, etc. Such underhanded methods of CBR attack are quite probable, since they exclude the possibility of being detected by the attacked by means of their sense organs. They are also feasible due to available means of launching and methods of CBR attacks. In addition, the attacker will regularly try at surprise, aiming to expose the defenders as long as possible to unnoticeable contamination, one of the decisive factors for the success of CBR attack. Thus, for example, if the unprotected human organism is exposed to the activity of lethal concentrations of nerve chemical agents for one or a couple of minutes (lethal concentration of "sarin" amounts to 150 mg minutes /1 m^3), death follows in a few minutes. Even if the toxicity of classical chemical weapons and military radioactive materials is smaller, nevertheless, in their case too, length of exposure is a factor which will always be taken into account by the attacker. This does not mean that the onset of radioactivity cannot be detected by means of the sense organs in some cases; this occurs in case of small concentrations of poisons that evoke objective signs and where death is not immediate, when changes occur in vegetation due to the presence of long-lasting chemical agents, etc. Such discoveries make it possible to undertake all protective measures in time. Meanwhile, we must not rely merely on detection by means of the sense organs. Proper timing in the detection of CBR contamination is only possible with the aid of reliable instruments of CBR detection. This demands that observation be so organized as to enable instrumental control of the total area, which means, in other words, that a corresponding system of observation is organized. A CBR attack may also be carried out in such a manner that it contaminates areas for which it was not intended, with the constant danger of contamination thus threatening units existing outside of these areas (the spread of fumes of chemical agents, use of contaminated water, dispersal of contaminated dust by winds, etc.) For this reason it is necessary for organs of observation to seek out such contaminated areas; this means that they must move over the areas to which they have been assigned in order to detect with the aid of instruments the presence of CBR materials. In the case of "static observation," it may happen that units will be exposed to such contamination without the organs of observation noticing it; this is a certainty if they are located at a distance from the area. This shortcoming of "static observation" may in large measure be averted by a "system of mobile observation stations."

A second weakness of static observation derives from the enlarged size of areas (zones, directions) of unit operation, which are in large measure unoccupied by human forces and not covered by the observation network. Since contaminating materials can be carried over into unoccupied areas and interspaces which are not under the surveillance of anyone, it is necessary that they too be controlled as a constant source of danger. In the sense of ABC observation, such "interspaces" (uninteresting areas) almost do not exist; in so far as they exist, they are certainly much smaller than the interspaces of the unit which operates in such a territory. Nevertheless it is possible and necessary to designate more important objectives in the interspace which must be especially controlled

(paths, sources of water, streams, small interspaces from which chemical agents in strong concentrations may be operative, etc.). Such interspaces cannot be controlled with the existing methods of observation except by means of sight and hearing, and this only when they are small in area.

On the other hand, one can control such unoccupied sections and interspaces with mobile observation stations; if not completely, at least to a large extent and at the most important points, whereby the problem of their surveillance is solved in a large measure.

The third weakness of static observation lies in the limited possibilities of the observation organs, both with regards to their number, as well as to their preparedness. Reconnoitering units of ABC defense are best equipped with technical means for CBR detection and professionally most competent in the problems of ABC observation. However, the number of observation organs which they can form is far smaller than the number of observation organs of other branches of arms and services which, along with their own assignments, also perform tasks of ABC observation. They are, nevertheless, best qualified for the fulfillment of the basic problems of ABC observation, and as such are given larger assignments -- both with regard to technical skill as well as to the extent of the area controlled -- than the observation organs of other arms and services. If the observation organ of ABC defense is placed at a single point, its area of observation is approximately equal to the area of an observation organ of any other arms of service; with this type of observation it is objectively not feasible that it serve a higher unit or a larger number of units. During the period of detection of CBR attack, there certainly exists no difference, either in the assignment or in the size of the zone that is to be observed, between the observation organs of arms and services on the one hand, and ABC observation organs on the other, despite the fact that they differ greatly in their potentials. Furthermore, the observation organ of a department or service finds itself in a difficult situation, since it must also carry out its own departmental assignments of observation.

During the period of observation the most important problem of the total system of observation is the detection of the onset of CBR contamination. During this period it is absolutely necessary that there be maximum utilization of all observation organs, especially those of ABC defense which have the greatest resources available to them. Next in order comes the notification of the units about the CBR attack, inspection of the contaminated area, and other assignments, all of which are performed exclusively by the organs of ABC defense. Were one to make a comparison, it would be obvious that better use could be made of the observation unit, thus placing under its control not only the interspaces but also parts of the observation zones of arms and service organs. In this case the observation organs of ABC defense would truly be working for the units they support, since they would be functioning over the whole, or at least over most, of the territory of the respective units. In this manner they would guarantee with their technical competence a more certain, precise, and timely detection of CBR contamination. Because they must support, in comparison with other observation organs, greater units, they

must -- and due to their mobility they also can -- conduct observation during movement.

The large areas which all observation organs must control, particularly the ABC defense organs (bearing in mind the limitations of their capacities), impose the necessity that the system of observation be used in the most economical manner. The necessary economy may be best achieved by means of mobile observation stations. With this method, the reconnoitering units of ABC defense would be able to fulfill the function of observation for the total unit which they support, not only for a smaller section of it. In addition to this, it would be possible to control with a small number of observation organs a part of, or the total area of the operation of a combined-arms or other unit. Finally, it is valid to conclude that mobile observation stations would satisfy the principle of economical utilization of ABC defense units far better than static observation.

The Concept and Basic Characteristics of Mobile Observation Stations

If the static system of observation is handicapped with so many shortcommings, it should be necessary to determine to what extent mobile observation stations remove these shortcomings and what their general characteristics consist of.

For detection of an ABC attack, one uses the total network of observation organs, including primarily the observation organs of ABC defense units. On the other hand, for the purpose of establishing the fact of an ABC attack (identification) only ABC defense units are utilized. Up to the present this task has been performed by the movement of the ABC defense observation unit to the source of contamination, by which process the observation organ changes into an ABC patrol. In this respect there is not a significant difference between the older and newer method of observation. The new point of view strives to achieve (during the period of detection of an ABC attack) for the work of almost all observation organs to be based on mobile observation. Because it would carry out its assignments on the move, such an organ would have certain characteristics of a patrol; however, only certain ones. This pertains particularly to the observation organs of lower units of the military departments which are tied to relatively small territories. They predominantly perform tasks which require remaining on one spot, and in their numerical composition do not correspond to a patrol. We believe that the terms "patrol", or "observation organ" are not essential, and that at this stage it is not necessary to seek a definition for such an organ. Here we are primarily interested in the fundamental differences between the observation organ of ABC defense and the observation organ of departments and services. This difference may be summed up in the following manner.

The observation organ of the department of ABC defense controls a significantly larger territory upon which is operative a combined or departmental unit, on whose account it works and carries out exclusively the tasks of ABC observation (meteorological observation is also here

included). Since there will usually be a shortage of such organs and because they support a larger unit (control a wider area), they are equipped with spedial methods of detection and means of transportation. They must, and can, carry out their assignments on the move. This applies to the observation organs of ABC defense and, more or less, to all units from the regiment upwards, for they are almost equal in strength.

Observation organs of the branches of arms primarily perform the duties of their branches; ABC observation is only a supplementary assignment. The attention of the observation organs of the majority of military branches is mainly directed to observation of the enemy and to a lesser extent to the surveillance of their own territories. Movement for the purpose of mobile ABC observation would, therefore, separate these organs from their fundamental duties, particularly if one keeps in mind that they are numerically smaller in composition. Observers of small units and observation organs which are located outside the area of their unit (e. g., the observation station of the commander of a battery) will almost not require mobility in performing the task of ABC observation. Mobile observation is necessary in units in whose placement their exist interspaces along the front and in depth (infantry regiment, battalion or larger units in firing positions, an armored battalion in positions of defense, a base, etc.).

Taking into account the nature of the territory and the often limited possibilities of movement when fulfilling the assignments of ABC observation, the system of mobile observation must be combined with observation from a stationary point, i.e., observation from one position for the whole duration of carrying out the assignment. Even those observation organs which survey a wider zone and have the possibilities of moving over this area, may periodically remain stationed at places which are regarded as favorable and important from the viewpoint of observation. In the task of instructing the observation organs, it is necessary, along with the rest, to designate which places (regions) are of greatest importance in a given situation and where it is necessary to detect CFR contamination as soon as possible. As long as such localities are of greater importance they will be inspected more frequently, and the observation organs will remain on them for longer periods of time (e. g., passage of a unit through a narrow pass). Because the principle task of the total system of observation is the timely notification of the units about the preparation, onset, course, or completion of an ABC attack, the center of observation must be set on regions (positions) on which human forces are located, on the directions (lines of communication) in which the human forces move, sources of water, places of storage and preparation of articles of food,etc. Designating a point of concentration for observation does not exclude possible vigilance in the observation of the remaining regions, for contamination in any one area also represents a danger to the neighboring regions.

Once the regions (zones) of mobile observation have been decided upon, it is necessary to calculate the duration of movement in a given direction as well as the time spent by the observation organ at individual points. This represents one of the main problems of mobile observation, since there exist two dangers: assigning too large an area will result in

superficial observation, and too small an area, while evoking detailed observation, will not include all important points. In calculating the time necessary for achieving control of the designated zone of observation one must evaluate the following.

1) Territory: lines of communication (quality, length, gradients, direction of expanse) and possibility of passage by motor vehicles or on foot;

2) Meteorological phenomena that affect movement and action of CBR contaminated materials;

3) The observation organ's capacity to perform (based on enemy action on land and in the air), as well as the need to camouflage its own lines;

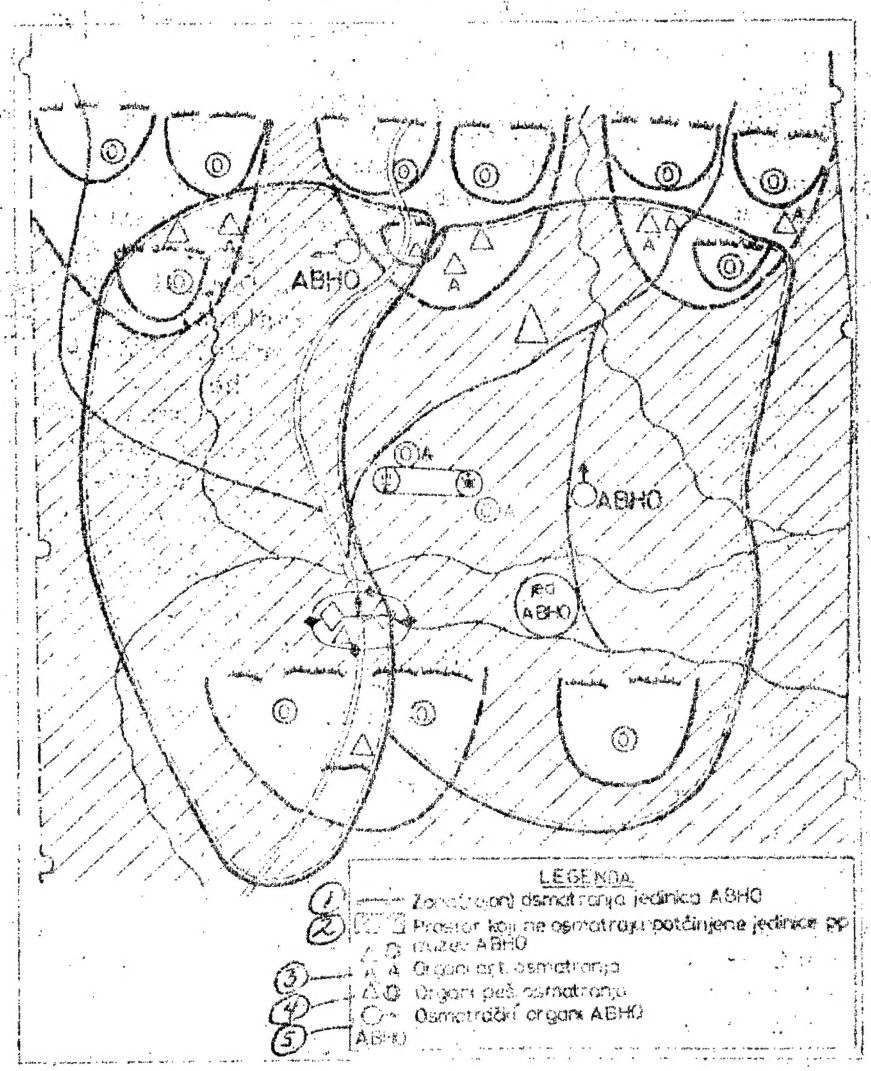
4) The capability of the observation organ for movement in the designated zone (quality of transport vehicles, ability for movement on foot, experience in observation, etc.).

If we were, in the end, to draw a parallel between the existing method of observation of ABC defense units (the so-called static observation) on the one hand, and the method of observation by means of mobile observation units on the other, we would arrive at the obvious conclusion that both methods must continuously complement one another. Mobile observation is actually nothing else but the setting of stationary ABC observation units on the move by means of suitable vehicles, or sometimes on foot, so that they would be in the position to survey the total region of a unit which is significantly larger in expanse that it had been formerly. This observation station, instead of remaining in one position and surveying a relatively small surface, moves over a wider expanse (depending on the ease of communication and passage over the area and the nature of the assignment) and generally surveys the area by means of special instruments. In the process of mobile observation, the observation unit may remain stationary at a spot for longer or shorter periods of time; this, however, will be a less frequent case.

Organization of Mobile Observation Stations in the Infantry Regiment in Defense

ABC observation organized by an infantry regiment in defense undoubtedly presents the most delicate problems of observation. It is far more difficult in the regiment than in any other larger unit, and probably more difficult than all other observation in the regiment. This derives from the fact that its human forces have the densest distribution (primarily in the immediate point of contact), that its number of ABC defense observation organs is limited, that its greatest zone of activity is precisely in defense, and that it contains a dense network of observation organs of military branches with which the work of the observation organs of ABC defense units has to be integrated. With the organization of mobile observation stations as a complement to static observation (see diagram) one removes the greatest part of the above mentioned shortcomings. This is evident from the following facts.

BASIC PLAN OF OBSERVATION IN THE INFANTRY REGIMENT



Legend: 1) Zone (region) of observation of ABC defense units; 2) Area not surveyed by subordinate units of the infantry regiment, excluding ABC defense units; 3) Artillery observation organs; 4) Infantry observation organs; 5) ABC defense observation organs.

1) In defense, a regimental region may enclose an area up to 40 km^2 in size, which it is simply impossible to cover with ABC observation stations, and certainly not with static ones. If one wishes to survey the whole area, this is only possible with the use of motor vehicles which would carry the observation organs with the necessary instruments. Even if they had to move in some parts of the territory on foot this would not greatly retard the speed of their work.

2) Even if regions on which human forces are located form the center of concentration of observation, they are nevertheless, not all covered by the observation organs of ABC defense, due to the impossibility of movement among the positions (it would lead to the uncovering of positions and exposure to enemy fire). Under most favorable conditions, the observation organs of ABC defense cover about 70% of the human forces. Only trenches in the first line are not included in their observation. On the other hand, this deficiency is solved to some degree by the participation of every soldier in the detection of ABC attack by means of the sense organs. Because the leading regions of defense are protected by human forces (there exist almost no interspaces), this detection of contamination by means of sense organs comes to better expression than in larger units.

3. The observation zones of ABC defense organs overlap, and in some places completely cover, the observation zones of the remaining observation organs; this occurs in the regions of distribution of units and thus ensures greater possibility of detection of an ABC attack. To the degree that more perfected instruments for detection of ABC attack will be introduced into the units of military branches, the need for an overlap of the observation zones of ABC defense organs and of military departments will decrease.

4) Notification of a completed ABC attack is carried out through the system of communication of the regiment, the radio system of the ABC defense observation organ, optical signals (between the ABC defense organ and the unit on whose territory the ABC organ is located at the time of discovery of ABC characteristics), as well as by the use of reconnoitering vehicles for transmitting the information to the nearest line of communication. The advantage of a system of notification working in conjunction with mobile ABC defense observation organs lies in the fact that one may make use of the lines of communication of artillery and foot battalions, which is not always the case in a system of static observation.

In some situations one may also approach a form of organization of observation in which one ABC defense observation organ would be tied to a narrower zone, surveying a particularly important objective, while other organs (insofar as they are at the disposal of the regiment) will survey wider zones.

ABC defense observation organs are exempt from the task of observing enemy positions and are, as regards the designzted zone of observation, oriented to performing the following tasks: discovery of preparations for an airborne attack on the basis of sighs which may be detected at time of flight of enemy planes, detection of contamination (disregarding the manner in which it was effected), the taking os samples of contaminated material and their delivery, inspection of the contaminated surface, notifying units

of the danger and the alarm, and meteorological observation. Taking into account the fact that one cannot observe the firing positions of enemy ABC launching devices from the front lines (they will certainly be screened from view from the ground or sometimes sunk in the ground) and that special technical knowledge is not required for the sighting of eventual signs of enemy preparation for attack (in so far as such sighs would be visible at all), these tasks may also be undertaken by the observation organs of foot units and of the artillery. It would be too uneconomical and too risky to engage the ABC defense observation organs in such tasks under the present conditions of modern techniques for ABC attacks, which achieve relatively precise aim from great distances. It would appear that the method of balloon attack, which could be sighted from our first lines and which required the placement of the chemical observation organs somewhere near the front lines, has ceased to exist. In this manner the observation system of ABC defense would be directed towards tasks which it must, and can, solve.

The advantages of the system of mobile observation stations are generally best realized through the use of reconnoitering units of ABC defense (in the role of observation organs), since the latter are capable of being attached to it. Observation organs of combined units, branches of arms, and services can carry out the tasks of ABC observation by means of mobile observation in conformity with conditions under which they perform their own basic duties. For this reason, it is absolutely necessary that one work out in a more precise manner, approximately on the principles presented in this article, the duties and roles of these organs.

As an idea that has not been empirically tested, the system of mobile observation stations cannot completely, nor immediately, eject the system of static observation. It is necessary that this system, probably a better one, be established and developed within the general framework of the present system of observation. For this reason, it should be given practical application in joint and other exercises. Should the results of the system of mobile observation stations be such as to indicate that it can replace the system of static observation, its final adoption would certainly require a more detailed theoretical study.

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